S. HRG. 107–267

THE ROLE OF TAX INCENTIVES IN ENERGY POLICY

HEARINGS

BEFORE THE

COMMITTEE ON FINANCE UNITED STATES SENATE

ONE HUNDRED SEVENTH CONGRESS

FIRST SESSION

JULY 10 AND 11, 2001

Printed for the use of the Committee on Finance

U.S. GOVERNMENT PRINTING OFFICE

77–498—PDF WASHINGTON : 2001

For sale by the Superintendent of Documents, U.S. Government Printing Office
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THE ROLE OF TAX INCENTIVES IN ENERGY POLICY

TUESDAY, JULY 10, 2001

U.S. SENATE,
COMMITTEE ON FINANCE,
Washington, DC.

The hearing was convened, pursuant to notice, at 10:05 a.m., in room 215, Dirksen Senate Office Building, Hon. Max Baucus (chairman of the committee) presiding.

Present: Senators Bingaman, Lincoln, Grassley, Hatch, Nickles, and Snowe.

OPENING STATEMENT OF HON. MAX BAUCUS, A U.S. SENATOR FROM MONTANA, CHAIRMAN, COMMITTEE ON FINANCE

The CHAIRMAN. The hearing will come to order.

This is the first in a series of hearings on the role of tax incentives in energy policy. As we all know, our Nation is facing another energy crunch. The Finance Committee must be prepared to act in the face of the current situation. For that reason, these hearings will prepare the committee, it is our hope, for action on energy tax issues.

A number of tax incentives have been proposed to accomplish our objectives. Both the Chairman and Ranking Member of the Energy Committee have introduced a comprehensive tax legislation to accomplish their goals. I might say, we are lucky on this committee to have Senators Bingaman and Murkowski as well. They are the energy policy experts and they can help us bridge the gap between the Energy and the Finance Committee.

It is important that the Finance Committee examine the utility of tax incentives for advancing energy policy goals. We will do that during the hearings. But it is equally important that we consider the whole range of policies that would be affected by tax provisions.

We cannot afford to view tax, energy, environment, or transportation policy in a vacuum; each is important. Nor can we afford to ignore budgetary constraints. During these hearings we must balance our energy, environment, and transportation tax policies against these revenue constraints. If we forget, I know that another member of this committee, Senator Conrad, will remind us.

The energy tax proposals span a great range of issues. Therefore, I have decided to break up the hearings into three parts. The subject of today's hearing is alternative motor fuels and alternative fuel vehicles.

Tomorrow, we will cover supply and demand of conventional fuels and development of renewable energy sources. Later this

year, we will continue to examine energy issues. That third hearing will be on restructuring of the electric utilities industry and clean coal technologies.

I also hope to conduct a hearing in Montana in August to consider energy tax provisions important to rural and Western States, in particular.

Now I would like to turn to the subject of today's hearing. We have just finished celebrating America's independence over the July 4th holiday. Many Americans surely noticed high prices at the gas pumps. Folks that took family vacations for the 4th of July, and workers across the country, continue to feel the pinch of high gasoline prices.

That is particularly true in my home State of Montana. Many people must drive great distances just to get to their jobs. In my mind, that raises an interesting point. We are an independent Nation. We are proud of this independence, but we are dependent on foreign sources of energy.

In 1992, we set goals in this country to become less reliant on traditional petroleum fuels. We said that 10 percent of fuels powering light-duty vehicles should be alternative vehicle by the year 2000. We said that 30 percent should be alternative fuels by the year 2010.

Where are we now? Nowhere near those goals. By 2000, we had achieved only 3.6 percent replacement of traditional fuels with alternative fuels.

Today we will examine the state of our energy policy and we will hear about the Tax Code provisions that move us toward our energy policy. We will hear about smart ways to further our energy, environment, and transportation objectives in the future.

We have a diverse panel of witnesses. Each comes to the table with a different area of expertise. We have scientists, we have environmentalists, technology experts, transportation experts, energy policy experts, and economists. I look forward to hearing about the energy tax proposals from such varied perspectives.

We will hear about the relative success of ethanol in achieving market penetration. It really is the lone success story in the world of alternative fuels. The signs indicate that ethanol will continue to grow in importance as an alternative fuel source.

In addition, the automotive industry has started to embrace alternative fuel vehicles. The tax incentives introduced in 1992 in Sections 30 and 179(a) have encouraged large auto makers to produce a limited number of alternative fuel vehicles. There are over 1,700 of these on the roads in my own State of Montana. Nonetheless, alternative fuel vehicles still make up only 0.4 percent of all vehicles nationwide.

Today, we will learn how well tax incentives have worked. Can they be improved? Are there other tax incentives that would work better?

Throughout today's hearing I will have three questions. The first, will be what were our goals, and what tax incentives were enacted to advance those goals? Second, how far have we gone toward

achieving the goals? Third, what can we do to achieve them in the future, or what changes do we think make sense?*

I must thank, at this point, Senator Grassley for helping to put this hearing together.

Senator, my good friend, it is time for you to give your opening remarks.

OPENING STATEMENT OF HON. CHARLES E. GRASSLEY, A U.S. SENATOR FROM IOWA

Senator GRASSLEY. Well, thank you very much. It is very important that we have this hearing, because we know that the energy committees are going to be producing a bill, and tax portions of energy issues are very, very important, and within the jurisdiction of this committee.

I would say, like you said, we are fortunate to have the Chairman and Ranking Members of the other committee, also members of this committee. So, there is a real opportunity to work together here to have a common approach by two committees to help with the energy issues that are before us.

I am like any other American. I have gotten used to—when I turn on the light switch, the lights come on, and when I go up to the gas pump there is gas there to pump.

I want it left that way. I do not want any doubt in my mind that, when I turn on the light switch, the lights are going to come on, or when I put the gas hose into my tank and I squeeze the lever, that I am going to get gas out of that pump for my car. When I want lights, I want lights. When I want to go someplace, I want gasoline for my car to go there.

Anything short of that that does not have the margin that is available for all unforeseen consequences is something that is going to hurt the economy of the United States and hurt the standard of living of American citizens, and it is something that we are used to and we ought to continue to be used to it if America is going to be the great Nation it has always been.

So, that is where I come from when it comes to the energy crisis, that we have to have margins. When we do not have those margins, that is why we have brown-outs and why we have higher gasoline prices, as we have recently had.

There is not any reason for it in America, and there does not have to be a reason for it. This is what we are used to. For America to be great, we are going to have to continue to have that sort of energy environment. We can have, and we will have.

During the past decade, we have seen U.S. oil production decrease 18 percent, at the same time we have seen consumption rise 14 percent. As a result, U.S. dependence upon foreign oil increased 34 percent. We now depend on foreign oil cartels for 58 percent of our crude oil, compared to just 36 percent during the Arab oil embargo.

Americans should not be any more satisfied with the oil cartel strangling us economically than we would our CEOs of our major companies violating the antitrust laws and strangling us economi-

*For more information on this subject, *see also*, Joint Committee on Taxation staff report "Description of Federal Tax Provisions Relating to Energy," July 9, 2001 (JCX–57–01).

cally with higher prices. Yet, we somehow seem to. But we do not need to, and that is what energy independence is all about.

There is no reason for people in my State, or in Montana, or anyplace else worrying about whether they have got to choose between food and heat in the winter time. But, yet, last winter, Iowa families were forced to pay heating bills nearly 75 percent higher than the previous year.

Just a few days ago, a national average for a gallon of regular gasoline rose to $1.65. Now, last weekend at the Music Station in Cedar Falls, Iowa, I was able to pay $1.19.

Now, how come it can be $1.19 one time and $1.65 another time? Only because of the economics. When you have less supply, obviously, price goes up. If you want price to come down, you get supply up. I mean, it is the simple laws of economics.

These higher energy costs are taking tremendous and serious toll on our economy in destroying livelihoods. The papers are full of stories of trucking companies, businesses, and factories being forced to lay off workers and curtail production.

In our States of Montana and Iowa, we have seen farmers' input costs spike sharply. At a time when farmers have been experiencing historically low commodity prices, surging natural gas prices have increased the price of fertilizer 90 percent.

A year ago, we were paying $225 for my son to buy anhydrous ammonia as a nitrogen source for his corn as fertilizer. This year, at spot prices, it was close to $400 per ton. It does not have to be that way. Supply up, price down.

The current situation, it seems, economically, illustrates the importance of increasing and diversifying our domestic energy production, including advancing renewable and alternative sources like wind, biomass, soy, diesel, and ethanol.

We must continue to develop renewable alternative energy sources as an integral part of our National energy system. First, alternative energy enhances our fuel diversity, thereby providing the United States some insulation from oil supply dominated by the Middle East.

Our national security is currently threatened by heavily relying on oil from abroad. Second, domestically produced alternative energy creates American jobs and strengthens our economy. Finally, alternative energy makes valuable contributions to maintaining clean air and a cleaner environment.

As many of my colleagues on this committee know, I have long been a supporter of alternative and renewable sources of energy as a way of protecting our environment and increasing our energy independence. Wind, biomass, and ethanol are alternative energy sources that, with my support, are working to reduce our Nation's dependence on foreign oil.

So I appreciate very much, Mr. Chairman, your moving ahead with this hearing. I hope that energy reform, as a major issue on the Senate floor, arrives very, very soon because it is something that not only deals with energy, but deals with the viability of our entire economy.

Thank you.

The CHAIRMAN. Thank you very much, Senator.

I would also like to, at this time, take a moment to thank you for your decades of leadership on many energy issues, on agricultural issues, and also for promoting ethanol. You have been a real leader and I compliment you for that.

Second, I thank you, Senator, for the comments you made on the Senate floor the other day regarding moving 2.5 cents on the tax on gasohol from the general fund to the Highway Trust Fund.

You clearly recognize that it is unfair to consumers and highway builders that highway taxes, including the 2.5 cents from gasohol, continued to be directed to the general fund instead of the Highway Trust Fund where it belongs. I agree with you.

I, frankly, have made a commitment that I have been working on for some time that is legislation to help balance the scales a little by doing what you suggested on the floor, that is, moving that 2.5 cents to the trust fund.

I played a role in moving other general funds to the trust fund when we enacted T-21, and I support your efforts, I know, to move that 2.5-cent tax on gasohol from the general fund to the Highway Trust Fund, and I compliment you for your efforts.

Senator GRASSLEY. Yes. Well, as you compliment me about ethanol, obviously it is very fair for me, and right, as your constituents know, that you need to be thanked by me and others for your leadership on transportation issues, specifically your efforts to restore the integrity of the Highway Trust Fund.

I know that transportation issues are very important to you now that you have your tenure of Chairman of this committee, and I look forward to working with you on those transportation issues.

You are very correct. The increased use of ethanol is a good thing. It has helped benefit our States of Iowa and Montana, and many other States. As the ethanol industry continues to expand, it will help our economy, our environment, and aid us in becoming energy independent. I firmly believe that, for these reasons, that as a nation we need to encourage the production and use of ethanol and other alternative fuels.

In short, if we can work together in finding common ground in our efforts to reduce our dependence upon foreign energy, we will all be winners—the consumer, the domestic energy producers, and the highway industry alike.

Certainly you and I, throughout the tax bill, have found common ground and will continue to find common ground. These are fuel taxes. Just as customs fees should go to Customs, fuel taxes should go where they belong, into the Highway Trust Fund. I believe that moving this 2.5 cents is the right thing to do, and I plan to support the 2.5-cent transfer in your legislation.

The CHAIRMAN. Thank you, Senator.

I now would like to introduce the panel of witnesses. Before I begin, though, we had a last-minute addition to today's hearing. Senator Dayton has asked to testify. He will probably arrive sometime later during our proceedings, and we look forward to his remarks when, and if, he does arrive.

But now let us get to our witnesses. Starting from my left, Mr. Jim Wells. Mr. Wells is director of Natural Resources and Environment at the U.S. General Accounting Office.

Mr. Wells will testify regarding the national energy policy goals set in 1992 with the enactment of the Energy Policy Act. I would remind our listeners here that that law sought 10 percent market penetration of alternative fuels by 2000, and 30 percent by the year 2010.

His testimony, I think, will be a good introduction to the hearing because he addresses what has been done to achieve those goals, what has prevented the attainment of those goals, and what challenges lie ahead.

Second, we have Mr. James Cannon. Mr. Cannon is president of Energy Futures, Inc., in Boulder, Colorado. He is testifying on behalf of Inform, Inc., a New York-based research organization.

Mr. Cannon is an expert in alternative fuels. He will give testimony about the various alternative fuels, the barriers to market penetration of various fuels, and the role of tax incentives for encouraging alternative fuel use.

Next, Mr. Peter Ruane. Mr. Ruane is president and CEO of the American Road & Transportation Builders Association. He will testify about the implications for the Federal Highway Trust Fund and providing incentives for increased use of alternative fuels.

After Mr. Ruane, we have Josephine Cooper. Ms. Cooper is president and CEO of the Alliance of American Automobile Manufacturers. Ms. Cooper will provide valuable testimony about the kinds of technologies manufacturers have been able to achieve up to now in bringing alternative fuel vehicles to market, and she will help us understand what we may have to do to further accomplish these goals.

Next, we have Daniel Lashof. Dr. Lashof is a science director for the Natural Resources Defense Council. He will focus on implications for the environment of providing incentives for increased use of alternative fuels. He will evaluate the relative environmental merits of various tax proposals to encourage use of alternative fuels in alternative fuel vehicles.

To his left, is Robert Dinneen, vice president of Renewable Fuels Association. Mr. Dinneen will testify about our experience with the alternative fuel that has been most successful in gaining a share of the fuels market, which is ethanol.

Finally, Kevin Hassett. Mr. Hassett is resident scholar with the American Enterprise Institute. Mr. Hassett will give the economists' perspective about the utility of using tax incentives for promoting use of alternative fuels and alternative fuel vehicles.

So, let us gets started with Mr. Wells. Before you begin, Mr. Wells, I might remind everybody that your full statement will be included in the record and you will have 5 minutes to testify.

We have got some lights down there. It starts out green for four minutes, then turns to the amber color when there is one minute remaining. The red light means 5 minutes are up. We are pretty good about enforcing that five-minute rule.

Mr. WELLS. I understand the rules of the highway.

The CHAIRMAN. We give a little bit here, but would encourage everybody to do what he or she can to speak within the 5 minutes. Thank you.

Mr. WELLS. Fair enough.

The CHAIRMAN. Go ahead.

STATEMENT OF JIM WELLS, DIRECTOR OF NATURAL RESOURCES AND ENVIRONMENT, GENERAL ACCOUNTING OFFICE, WASHINGTON, DC

Mr. WELLS. Thank you, Mr. Chairman, members of the committee.

We are pleased to discuss GAO's reports examining the Federal programs to promote alternative fuel vehicles and the fuel use in the transportation sector.

Today, I will just briefly highlight three points in my short statement. How many vehicles do we have, and what is the fuel use? You have about a million vehicles today, but you need to be careful when you quote this figure.

Five hundred thousand of these vehicles are somewhat true alternative vehicles. The other 500,000 are, in fact, bi-fueled vehicles, meaning that they can run on alternative fuels, but most probably are being fueled with gasoline. This is roughly equivalent to 0.4 percent of all vehicles on the road, which is a shade over 200 million vehicles.

Look at my first chart. What I want to draw your attention to, is the bottom gratiated area is, in fact, the petroleum-based, gasoline, fuel of choice quantities. The sliver along the top is the alternative fuel use.

This fuel is used by vehicles.

The CHAIRMAN. It is hard to read those numbers. What are the X and Y axis numbers?

Mr. WELLS. To your left would be the gasoline equivalent gallons in billions. The years along the bottom would be from 1992, which was the date of the passage of the EPACT Act and setting of the goals, and we take you up through the present, 2001. So you get a view of billions of gasoline equivalent that are being used by oil as well as alternative fuels.

The CHAIRMAN. And the white line is alternative fuels?

Mr. WELLS. Alternative fuels is that sliver of line at the top.

The CHAIRMAN. Thank you.

Mr. WELLS. The fuel used by these vehicles account for about 350 million gasoline-equivalent gallons, or about 0.2 percent of the total vehicle fuels consumed in the year 2000.

When the alternative fuels used to blend or to increase oxygenates in gasoline are added, such as ethanol and the MTBE, the total increases to about 4.5 billion gallons, or less than 3 percent of the total 162 billion gallons of gasoline consumed in the year 2000.

There are a couple fundamental barriers that will explain this chart, and I will just quickly look at those. The first one, is the relatively low price of gasoline. Even today's gasoline prices are not high enough to induce many people to give up their conventional gasoline and diesel automobiles in favor of alternative vehicles.

For example, in an analysis performed last year for GAO, EIA estimated that even if you doubled the price of the crude oil—then at $20 a barrel—it would not significantly increase the market share for alternative fuel vehicles.

The price of gasoline would also have to go extremely high and stay there long enough to surpass other costs that the consumer faced in terms of higher vehicle purchase price, maintenance, limi-

tations in performance, and consumer unfamiliarity with the vehicles themselves.

My second point, is insufficient availability of alternative fuel refueling infrastructure. I want you to look at my second chart. Six thousand refueling stations for alternative fuels in the United States, compared with over 180,000 conventional stations. This gives you a perspective of density.

Everyone we talked to cited the lack of adequate refueling infrastructure as an impediment to using alternative fuels. It is kind of like a chicken and an egg scenario. Because of the insignificant number of the vehicles that are in the Nation's fleet, the owners of the gasoline refilling stations are very reluctant to provide the refueling facilities for the alternative fuel vehicles. For example, to build facilities that provide compressed natural gas, the estimate is about $300,000.

At the same time, the scarcity of the refueling stations defers the general public from buying the vehicles. Again, a catch-22 situation.

Lastly, in terms of impediments to a consumer or a fleet manager, alternative fuel vehicles do, in fact, cost more. For example, a vehicle that runs on compressed gas typically costs $3,000 to $5,000 more; electric powered, generally in the low $30,000's to $40,000.

Turning, briefly, to the last impediment that I wanted to highlight, the tax incentives. Congress clearly has supported and enacted tax incentives, including Federal tax exemptions, credits, and deductions.

I will refer now to my last chart, which is, in fact, based on U.S. Treasury Department estimates, that since the late 1970's, because this hearing is on alternative fuels, we have graphed the tax incentives that resulted in foregone tax revenues of about $13 billion for alcohol fuels, $600 million for clean-burning fuels, electric vehicles, and these are all in 2001 dollars.

These amounts, clearly, as you already know, represent only a small share of the total transportation tax incentives that exist over the years, much of which has been devoted to conventional fuels.

In conclusion, so far, the facts are alternative fuels and vehicles have not made much of a dent in the fuel or the vehicle use. It is primarily because of those fundamental economic obstacles that I just talked about.

As we reported in our February, 2000 report, we gave you a reporting of where we stood in terms of achievement of the goals. Any significant increase in alternative motor fuels and vehicles by the general public will clearly depend on two main factors: one, a dramatic and sustained increase in the price of gasoline, or a very large incentive far above the current levels to reduce the cost of producing and using alternative fuels in vehicles.

Mr. Chairman, I will stop here. I will conclude my remarks. But I do not want to leave you with five minutes of gloom and doom. We may be on the brink of major technology breakthroughs that clearly could have some major impact long-term in terms of where we are headed with alternative fuels.

I, like you, look forward to hearing from some of the experts today about what the future may hold. Clearly, the presentation I give you today and the statistical data reporting is coming from an audited base. We look at what is and what was. These are the facts as we were able to determine them last year.

So, with that I will stop.

The CHAIRMAN. Thank you very much, Mr. Wells. That was very informative. Deeply appreciated.

[The prepared statement of Mr. Wells appears in the appendix.]

The CHAIRMAN. Mr. Cannon?

STATEMENT OF JAMES S. CANNON, PRESIDENT, ENERGY FUTURES, INC., ON BEHALF OF INFORM, INC., BOULDER, CO

Mr. CANNON. Mr. Chairman, members of the committee, the United States urgently needs to transform its transportation sector to address critical national energy, security, environmental, and public health concerns.

At stake in the decisions we make is the strength of our economy, the health of our environment and our children, as well as our competitiveness in the global transportation marketplace of the 21st century.

There are many reasons why the transition to clean alternative fuels and advanced engine technologies and transportation deserve a top national priority. The 217 million cars on the roads today consume over two-thirds of the Nation's oil, more than our entire national production. Almost 60 percent of our oil comes from foreign sources.

There are also compelling environmental and health reasons to make transportation innovation a priority. There are 121 air quality districts in the United States that now violate the 1970 Clean Air Act ambient air quality standards 18 years after the 1982 deadline for compliance.

There is little disagreement that the world will have to move away from oil-derived fuels to modes of transportation that are sustainable, i.e., pollution-free and based on the use of renewable resources. The main questions are what our transportation future will look like, and how rapidly can we get there.

We see two fundamental system shifts that can most readily and elegantly be made side-by-side. One major shift is from a conventional propulsion system powered by the internal combustion engine to the more efficient propulsion systems such as hybrid electric, and ultimately the fuel cell.

The second shift, is in fuels, from petroleum-based, high-carbon gasoline and diesel fuels to much cleaner fuels, and eventually to hydrogen.

I would like to make four observations and recommendations. The first, is the alternative fuel vehicle industry has emerged. When I began my work in 1986 in this field, there were virtually no alternative fuel vehicles marketed by original equipment manufacturers.

A limited number of conversions were exempt from EPA emission certifications. There were no AFEs at all in entire transportation markets, including buses. There was not a single operating fuel cell vehicle.

In 15 years, I have seen the stirrings of a virtual transportation revolution. Today, nearly every major auto maker in the world is marketing at least one AFV. Annual equipment automotive sales are measured now in thousands, tens of thousands of units per year. AFVs are being used in virtually every transportation application, from forklift trucks to semi's.

I have some data from the U.S. Energy Information Administration that shows where we stand today. There were somewhat over 400,000 AFVs operating in the United States in the year 2000.

The number of AFVs has grown by 75 percent since 1992. When you subtract the leading vehicle, propane, the growth of other alternative fuels has jumped by 600 percent.

The second point I want to make, is that government programs have served as a catalyst for this growth in the AFV market. For the first time in nearly a century, alternative fuels and propulsion systems are showing that we have the potential for challenging the prevailing transportation paradigm.

The last transition from oats to oil took about 40 years before gasoline-burning automobiles replaced the horse-drawn carriage. Our national energy, security, environmental, and health concerns suggest that we need to move quicker this time around.

Federal initiatives, to date, have focused attention of the private sector and, to a much lesser extent consumers, on AFVs. They have propelled major investments in R&D, they have accelerated the commercial introduction of new fuels and technologies.

These Federal initiatives have been mirrored by a plethora of State AFV programs. We have more than 30 States now with programs. The combination of Federal and State policies has resulted in a significant improvement in AFV technologies, but not yet a significant market penetration.

My second point, therefore, is that the job is far from done. Despite the progress to date, new transportation industries are not even close to being self-sustaining.

Nearly all of the 90 automobiles manufactured worldwide every minute burn petroleum, and nearly every one of the 6,000 gallons of gasoline burned in U.S. vehicles every second are used in conventionally-powered vehicles.

I have shown in Table 2 of my testimony that alternative fuel use and alternative fuel vehicles account for just 0.22 percent of total transportation fuel.

My next point, is that alternative fuel vehicles and advanced vehicle technologies have not reached the point where the sales are high enough to produce economies of scale in manufacturing, with a lowering of unit costs, to compete with conventional technologies.

Consequently, most AFVs carry a significant price premium. Moreover, most alternative fuels require a major investment in fueling infrastructure before they will be taken for granted by the consumer as reliable.

Until the economics of these vehicles and the fuels improve, the role of AFVs, hybrids, and fuel cell vehicles in the market will be limited and the potential energy benefits and environmental benefits will be largely unrealized.

My final point, is that we need a response equal to the scale of the magnitude of the problems themselves. This requires more ambitious government leadership.

There are several important lessons to be gleaned from the past. The first, is that mandates, although useful, have a shelf life and they increasingly meet with opposition the longer they are in effect.

The second, is about consumers. They want clean air, but they have shown that they are unwilling to invest in significantly incrementally costly vehicles.

The third, is about financial incentives. Experience has shown us that, when financial incentives are available to offset front-end capital costs, consumers and industries respond.

If tax incentives are to be effective in achieving multiple national goals, they must, in my opinion, increase with energy efficiency of fuel use and concomitantly with the level of reduction in greenhouse gas emissions. Second, they must increase with a degree of pollution reduction offered by the vehicles, protecting our environment and safeguarding public health.

Mr. Chairman and members of the committee, we have an historic opportunity to change course. Well-crafted financial incentives can be a key to driving such change. Capturing this opportunity can make the United States a leader in the move to environmentally sustainable transportation and a model for other countries to look to us for example.

This concludes my prepared statement. Thank you.

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

[The prepared statement of Mr. Cannon appears in the appendix.]

The CHAIRMAN. Mr. Ruane.

STATEMENT OF T. PETER RUANE, PRESIDENT AND CEO, AMERICAN ROAD & TRANSPORTATION BUILDERS ASSOCIATION, WASHINGTON, DC

Mr. RUANE. Good morning, Mr. Chairman and members of the committee.

The American Road & Transportation Builders Association, based in Washington, DC, will celebrate its 100 year anniversary next year.

We have some 5,000 member firms and member public agencies throughout the Nation. They belong to ARTBA because they support strong Federal investment in transportation improvement programs to meet the needs of our public and business community. The industry we represent generates some $185 billion of economic activity each year and sustains 2.2 million jobs.

At the outset, Mr. Chairman, I would like to thank you for giving our industry this opportunity to testify at this important hearing. Your understanding of, and longtime support for, transportation improvement programs and investment is deeply appreciated by the transportation and construction community.

Your leadership on T-21, and your unique leadership on protecting the integrity of the Highway Trust Fund, we would like to acknowledge again today.

My primary purpose here today is to bring to your attention the unique nexus between Federal transportation, energy, and environ-

mental policies. Policy in all of these areas have a common thread: the use of Federal tax law involving fuels to advance national objectives.

Unfortunately, these tax policies are often debated and decided separately, and thus in a vacuum, during a transportation bill, an energy bill, or an environmental bill. As a result, positive impacts in one policy area sometimes contradict, or even undermine, goals and objectives in another policy area.

As you know, since 1956 we have had a highway user fee system, where the motor fuels taxes were dedicated to our Highway Trust Fund. Congress passed this legislation to ensure that we have a pay-as-you-go system. Again, in 1998, the Congress reaffirmed this basic principle by passage of the Transportation Equity Act of the 21st Century.

Despite T-21's record surface transportation investment levels, current public funding for road, bridge, and mass transit improvements is not sufficient to maintain the physical conditions of the system, much less improve its overall performance.

The 1999 U.S. Department of Transportation report to Congress on highway system conditions and performance suggests a $50 billion-per-year Federal highway program is necessary just to maintain—just to maintain—current system conditions and performance levels over the period of 2004 to 2009. This is $17 billion per year more than what we expect in the year 2003 for the Federal program.

While this figure may seem staggering, there are some steps we can take, including now, that will help us fill this gap. Clearly, the intent of Congress in enacting T-21 was to make surface transportation investment a Federal priority.

But you should be aware that, as Congress discusses and debates a new Federal energy policy in the weeks ahead, that some current Federal energy policies work against the goals of T-21. For example, the purpose of the Energy Policy Act of 1992 was to accelerate the use of alternative motor fuels in the transportation sector, obviously a laudable goal. This act's stated goal is to replace 30 percent of the petroleum-based motor fuels by the year 2010. I think it would be instructive to ask, what impact would reaching such a goal have on Federal funding for highway and mass transit improvements? If the motor fuel sources are not taxed equivalently to gasoline, the impact would be devastating. It would be devastating to highway and mass transit programs in all States. Consider the impact of the current Federal tax treatment of ethanol/gasoline motor fuel blend sales.

As I must make clear at this point, ARTBA has no brief against the promotion of the use of ethanol as a motor fuel beyond the way it impacts the Highway Trust Fund.

Under current Federal law, a motorist purchasing gasohol with 10 percent ethanol pays a 13-cent-per-gallon excise, or 5.4 cents per gallon less than those who purchase straight gasoline. Of the 13 cents paid, a user fee of 10.4 cents goes to the Highway Trust Fund, 7.5 to the highway account and 2.8 to the mass transit account. And 2.5 cents is deposited in the Federal general fund for deficit reduction purposes.

This combination of tax incentives and deficit contributions results in some 7.9 cents per gallon not going to the Highway Trust Fund for each gallon sold. So, as a result of T-21's provisions that directly link incoming highway account revenues to annual Federal highway and bridge investment, the ethanol tax incentive has a direct consequence of making less revenue available for investment in needed highway and bridge improvements.

Current Federal tax policy on ethanol motor fuel sales results in approximately $1.1 billion per year of foregone Highway Trust Fund revenue account losses.

We have some very distinct recommendations to make. We believe that this issue of the loss of revenue will be a major issue in reauthorization in the year 2003. I think we all can acknowledge that we are at a crossroads and we face a crisis in our energy situation, as well as a crisis in our transportation capacity.

So, Mr. Chairman and members of the committee, as you develop the tax portions of the new Federal energy policy or environmental policy, we urge that you ensure the Federal funding for much-needed transportation improvements is not shortchanged in the pursuit of promoting use of alternative motor fuels. We will support you in any legislative effort to address the concerns we have raised.

As a short-term measure, we respectfully suggest that, since the Federal deficit has successfully been addressed, there is no further need to deposit 2.5 cents per gallon of tax on gasohol in the general fund. We encourage you to redirect this revenue stream, which generates about $400 million a year, to the Highway Trust Fund's highway account as a highway user fee.

Finally, we urge the Congress to initiate a comprehensive study that recommends financing mechanisms for Federal highway and mass transit investment in the future post-gasoline and -diesel era. We need, now, to prepare for transportation financing needs.

Mr. Chairman, thank you. I will be willing to answer any questions.

The CHAIRMAN. Thank you, Mr. Ruane, very much. That was very helpful.

[The prepared statement of Mr. Ruane appears in the appendix.]

The CHAIRMAN. Ms. Cooper?

STATEMENT OF JOSEPHINE S. COOPER, PRESIDENT AND CEO, ALLIANCE OF THE AUTOMOBILE MANUFACTURERS, WASHINGTON, DC

Ms. COOPER. Mr. Chairman, on behalf of the 13 members of the Alliance of Automobile Manufacturers, it is a pleasure to be here today to discuss our position on the role of cars and light trucks in our National energy policy.

I will make three basic points. First, existing energy policies, including the auto fuel economy program CAFE, are not delivering anticipated results. Second, to be successful we must maintain a consumer focus because consumers determine fuel economy every day through their purchasing decisions on dealers' lots.

Third, markets work. With your help, we can accelerate the introduction of breakthrough advance technology with fuel-efficient vehicles that will allow consumers to continue choosing vehicle attributes they need, while enjoying increased fuel economy.

We are a mobile society. Today, transportation accounts for nearly two-thirds of all oil consumption, and is almost 97 percent dependent on petroleum. Federal fuel economy is regulated by a 25-year-old regulatory program known as CAFE.

In 1992, the National Academy of Sciences called CAFE "a flawed program in need of review." The Academy is once again reviewing CAFE and will issue a report to Congress this summer. This report may well focus on how CAFE only addresses the supply side of the fuel economy equation.

But I am not here today to dwell on the inefficiencies in the CAFE program. Auto manufacturers have consistently increased the fuel efficiency of their models since the 1970's.

While car and light truck fuel efficiency continues to increase 2 percent per year since 1970 according to EPA, their combined fuel economy has stabilized for one reason: consumers are in the driver's seat when it comes to determining fuel economy. That is really the demand side of the fuel economy equation.

In surveys, consumers indicate they want greater fuel economy, but in their purchases they do not want to sacrifice size, safety, cargo room, acceleration, or other vehicle attributes to get it, even with today's gas prices.

Today, manufacturers offer more than 50 models with fuel economy ratings at 30 miles per gallon or greater. We also offer vehicles that achieve 40 miles per gallon or greater, but these highly fuel-efficient vehicles account for less than 2 percent of sales.

The auto industry strongly believes that technology, not CAFE, will allow us to address energy conservation goals and still provide consumers with vehicles that meet their family and business needs.

We support the tax credit provisions in Senator Hatch's bill, S. 760, or the Clear Act, which would provide tax incentives for fuel cells, hybrid electric vehicles, battery electric vehicles, and dedicated alternative fuel vehicles, as well as alternative fuel and alternative fuel infrastructure tax incentives.

We are working on slight modifications to the hybrid electric vehicle tax credits and we would like to see tax credit for advanced lean-burn technologies. The Clear Act would ensure that advance technologies are used to improve fuel economy. Performance incentives are tied to quantifiable improvements in fuel economy for a vehicle to be eligible for the tax credits.

While the total cost of the bill has yet to be scored, the costs of increased fuel prices to the American motoring public in the first half of this year are substantial.

New technologies and alternative fuels are needed to preserve consumer choice and reduce the demand for gasoline. The Clear Act is timeless. New technologies can set the stage for transforming the auto industry.

Today, you can purchase alternative fuel vehicles from subcompacts, to SUVs, to pick-ups. Alliance members are developing and introducing hybrid electric cars, SUVs, and pick-ups that can increase city fuel economy by up to 200 percent. They are working on the next generation of lean-burn technology and investing hundreds of millions of dollars in R&D to bring fuel cell vehicles to market in the next 5 to 10 years.

But consumers are still in the driver's seat. Advance technology vehicles hold great promise for increases in fuel efficiency without sacrificing the other vehicle attributes consumers desire. Just as important, the technology is transparent to the consumer.

These advance technology vehicles are more expensive than their gasoline counterparts during the early market introduction, when low production volumes cannot cover all the manufacturing costs.

Make no mistake, across-the-board tax credits will not completely cover the incremental costs of new advance technology. Tax credits will help bridge the gap towards winning broad acceptance among the public, leading to greater volume and sales throughout the entire fleet.

Providing consumer-based tax credits as these technologies first become available, for 6 years under the Clear Act, will help jumpstart market penetration and support broad energy efficiency and diversity goals.

Federal tax credits will provide a firm planning horizon on which consumers can base their future purchasing decisions and will send a strong signal to the broadest audience possible.

If I can leave one message with the committee today, it is to stress that all manufacturers have advanced technology programs to improve vehicle fuel efficiency, lower emissions, and increase motor vehicle safety.

In fact, many companies have advanced vehicles in the marketplace right now or have advanced plans for the near future. That is why now is the perfect time for the enactment of tax credits to help spur consumers to purchase these new vehicles which years of research and development have made possible.

In conclusion, we do need a new approach to vehicle energy policies based on technology, not mandates. As we go forward, we must maintain consumer focus.

Finally, tax credits under the Clear Act will accelerate the market penetration of advanced technology, highly fuel-efficient vehicles that consumers will buy and drive.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Ms. Cooper.

[The prepared statement of Ms. Cooper appears in the appendix.]

The CHAIRMAN. Dr. Lashof?

STATEMENT OF DANIEL LASHOF, SCIENCE DIRECTOR, NATIONAL RESOURCES DEFENSE COUNCIL, WASHINGTON, DC

Dr. LASHOF. Thank you, Mr. Chairman.

I would like to make three points in this morning's statement. First, that incentives should be used in combination with other policies to reduce petroleum consumption. Second, that performance-based tax credits that are well designed can play a very positive role in bringing advance technologies to market. Third, that the environment and economic benefits of a comprehensive policy along these lines would be very profound.

So, for the first point, as we have heard already, the Energy Policy Act of 1992 is not meeting its goal. Just to look at the numbers in a different way, gasoline consumption over the last decade has increased by 17 percent.

Despite the alternative fuels provisions in EPACT and elsewhere, our transportation system remains 97 percent dependent on petroleum. The failure of the U.S. to enact a comprehensive policy to reduce demand for petroleum has been extremely costly, both for the environment and for our economy.

Last year, U.S. consumers spent $186 billion on gasoline, and $106 billion on foreign oil. At the same time, petroleum combustion, specifically for transportation, generated 20 million tons of smog-forming pollution and 2.1 billion tons of global warming pollution.

Everyone is concerned about high oil prices now. We have to remember that oil prices are set on international markets. Given that the United States produces only about 12 percent of global petroleum supplies, even a major change in domestic production would have only a marginal effect on global markets.

I should point out that, in terms of reserves, the U.S. has only 3 percent of global oil reserves. So, it is inevitable that the U.S.'s share of global oil production will decline, regardless of where we drill in this country.

By contrast, the U.S. accounts for 25 percent of world petroleum demand. So we can have much greater influence on the market by addressing the demand side of the equation than we can through the supply side.

To do that, we need a policy that has three basic parts. One, we can reduce the distances that people feel they need to drive by promoting smart growth development patterns and convenient alternatives.

Second, we can reduce the energy needed to travel a given distance by increasing vehicle fuel efficiency. Third, we can reduce the petroleum needed per unit of fuel consumed by increasing the use of environmentally friendly alternative fuels. I believe we need a policy that addresses all three of those legs.

There are four basic tools that we can use: research and development, targeted incentives, the subject of this hearing, for more efficient technologies and systems. They should be based on performance.

Performance-based tax incentives can play a key role in commercializing advanced technologies by helping them cross the chasm sometimes called the "Valley of Death" between the results of basic research and development on the one hand, which are often supported by direct Federal research programs, and on the other hand, commercial-scale mass production that drives down costs.

That is the key role that tax incentives can play, to drive down new technology costs by moving them to the stage where they go into mass production.

The third area, is efficiency standards, including, in our view, higher corporate average fuel economy standards. In our view, in contrast, I guess, with the view of the Alliance of Automobile Manufacturers, these programs are very much complementary and should not at all be viewed as competitors to each other.

We believe that across-the-board increases in fuel economy standards are critically needed. They are the backbone of a policy to reduce overall U.S. petroleum demand.

The fourth policy tool is education and outreach on efficiency. These work best in combination with incentives in the other areas I mentioned.

Just briefly, as we have heard, the EPACT will not meet its policy goals. As you pointed out in your opening statement, there was a goal of 10 percent alternative fuels in the year 2000. We are nowhere close to that.

In fact, most of the non-petroleum fuel that is being used is actually MTBE, which NRDC believes needs to be phased out as quickly as possible because of the serious ground water contamination that it is contributing to. We can do that in a way that protects the air benefits that it has provided.

But, turning to the specific policy recommendations, I want to certainly thank Senator Hatch for his leadership in introducing the Clear Act. That is a model approach that we support, along with many other environmental organizations, because it is performance-based.

It links the incentive to achieving improvements in fuel economy. It also links the incentive to achieving superior performance on tail pipe emissions of directly health-threatening pollutants.

Similarly, as you move beyond the transportation sector, Mr. Chairman, there are other performance-based tax incentives that you should be considering, such as S. 207, introduced by Senators Smith and Feinstein, that addresses buildings. Senator Grassley is a co-sponsor of S. 686 that addresses appliances. Those are very positive measures.

Let me conclude that a comprehensive program that includes improvements in standards, as well as incentives, will have a profound effect and strong benefits.

The Union of Concerned Scientists recently concluded a study that estimates that a combination of tax incentives and higher fuel economy standards would save 540 million barrels of oil in the year 2010, reduce upstream smog-forming pollution by 320 million pounds, and reduce global warming pollution by 273 million tons.

So, in conclusion, Mr. Chairman, incentives such as those contained in the Clear Act have a very important role to play in a comprehensive policy designed to reduce our dependence on petroleum.

Thank you.

The CHAIRMAN. Thank you very much, Dr. Lashof. That was very informative.

[The prepared statement of Dr. Lashof appears in the appendix.]

The CHAIRMAN. Mr. Dinneen?

STATEMENT OF ROBERT DINNEEN, VICE PRESIDENT, RENEWABLE FUELS ASSOCIATION, WASHINGTON, DC

Mr. DINNEEN. Thank you, Mr. Chairman. Mr. Chairman and members of the committee, I want to thank you for the opportunity to provide comments on the importance of tax policy in determining our Nation's energy and economic priorities.

The RFA is a national trade association for the domestic ethanol industry. We represent 56 ethanol-producing facilities across the country that, this year, will produce about 2 billion gallons of fuel ethanol.

Our industry is growing at an unprecedented rate, largely among farmer-owned cooperatives, as farmers across the country invest their own money to better recognize the value-added opportunities of ethanol.

Now, obviously, tax policy can have a huge impact on energy markets. Consider for a moment that the Model T was originally designed to run on fuel ethanol. But taxes imposed on alcohol in the early 1920's and tax breaks provided to the oil industry forced a change to gasoline, a decision that set our country on a course of dependency upon petroleum that continues to impact our Nation's energy and economic future today.

Thankfully, the myopic focus on petroleum changed after the twin oil price shocks of the 1970's, and Congress created a number of programs to stimulate increased production and use of alternative fuels. One such program is the Federal Ethanol Tax Incentive Program.

I am here to tell you that that program has been an unmitigated success. Now, there may be little ethanol used in alternative fuel vehicles today, but ethanol-blended gasolines are used in approximately 15 percent of the Nation's motor fuel. We are absolutely an important component of the Nation's motor fuel market.

Look at what this program has done. It has created the single most important value-added market for farmers. As the third largest use of corn behind only feed and exports, ethanol production utilizes nearly 7 percent of the U.S. corn crop, over 600 million bushels of corn, adding $4.5 billion to the farm income annually.

The U.S. Department of Agriculture has determined that ethanol production adds 25 to 30 cents to every bushel of corn in this country.

According to the Midwestern Governors' Conference report that they released about a year ago, the economic impact of the demand for ethanol boosts total employment in this country by 200,000 jobs, it increases State tax receipts by $450 million, it improves the U.S. trade balance by $2 billion, and it results in a $3.6 billion to the Federal Treasury.

That is right. The reduced farm program costs and increased tax revenue attributable to the production and use of ethanol results in a $3.6 billion savings to the Federal Government.

In other words, for every dollar invested by the Federal Government in ethanol, seven dollars is returned to the Federal Treasury.

The Federal ethanol program has also improved air quality in our Nation's cities. Adding ethanol to gasoline increases the oxygen content in the fuel and allows a more complete combustion that reduces emissions of carbon monoxide, exhaust VOCs, particulates, and toxics.

Consider for a moment the success of the winter CO program. In 1992, there were 42 carbon monoxide non-attainment areas in this country. Today, there are less than 10. Adding oxygen to gasoline, adding ethanol to gasoline, is simply the most effective way of reducing carbon monoxide.

Carbon monoxide is also a precursor to the formation of urban ozone. So, ethanol-blended RFG, which is used in many midwestern cities today, has been an extremely successful ozone program as well.

But perhaps the most important environmental benefit of ethanol use is that it is the only liquid transportation fuel that has a greenhouse gas benefit. That is because growing crops for the production of ethanol takes carbon out of the atmosphere and provides a global warming benefit that no other liquid transportation fuel has.

Finally, the ethanol program is providing important energy benefits today. Today, as has been noted, we are more dependent on foreign Nations to supply our insatiable and growing appetite for oil than at any time in our history. We are importing 54 percent of our petroleum today.

At the same time, U.S. oil production has fallen to the lowest level in 30 years. Senator Grassley, you talked about the price volatility that is being caused today because of tight gasoline supplies.

There has not been an oil refinery built in this country in 25 years, but during that same time frame there have been 56 ethanol refineries built to add volume to a tightly-constrained market and moderating prices.

As our industry continues to grow and expand, it is going to grow beyond its traditional base in the midwest and beyond the current corn crop or the use of corn as its primary feed stock.

There are planned ethanol facilities in New Jersey using corn, in Maine using potatoes, in Alaska using wood, in Florida using agricultural waste, in New York using municipal solid waste, and in California using rice straw.

The ethanol industry is absolutely going to continue to grow and expand, and the environmental benefits are going to grow as other cellulosic feed stocks come into play.

Now is the time to extend this important program. For plants being built today, there is only going to be 4 years, likely, to recoup that investment. President Bush recommended extending the Federal ethanol program in his energy policy recommendations. I encourage this committee to act on his recommendation and extend this program.

Second, I would urge the committee to amend the existing small producer tax credit and make it more workable for farmer-owned cooperatives. I commend Senator Grassley for his efforts to address this issue. It has been passed by the Senate three times. I ask that it be included in legislation that will be enacted this year.

Finally, I would like to commend your efforts, Mr. Chairman, to work toward assuring that Congress' efforts to promote alternative fuels does not come at the expense of important highway funding.

We do not believe that any State should be penalized for encouraging the increased use of ethanol, and we support your efforts to move 2.5 cents currently going to deficit reduction back to the Highway Trust Fund.

In closing, Mr. Chairman, I want to add my voice to those that have applauded your efforts, and those of Senator Grassley and others in promoting the increased production and use of fuel ethanol.

You have helped create a vitally important domestic renewable energy industry. You can be proud of your accomplishment. We certainly thank you for your commitment to value-added agriculture and a sustainable energy future.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Mr. Dinneen.

[The prepared statement of Mr. Dinneen appears in the appendix.]

The CHAIRMAN. Mr. Hassett?

STATEMENT OF KEVIN HASSETT, RESIDENT SCHOLAR, AMERICAN ENTERPRISE INSTITUTE, WASHINGTON, DC

Mr. HASSETT. Thank you, Mr. Chairman.

Mr. Chairman, I am here today to talk about tax credits and what might happen were you to consider adopting various credits.

I have studied the impact of credits on the behavior of firms and individuals for many years, and recently co-authored a survey of the entire academic literature in the area for inclusion in the Handbook of Public Economics, which is the text that most graduate programs use to teach aspiring economists tax policy.

I know that you folks are considering tax credits for fuel-efficient vehicles at the consumer level. Let me begin by focusing on what we know about similar credits, what we have learned in the past when we tried to do something like that.

Back in the 1970's and 1980's, the U.S. adopted tax incentives to stimulate conservation investment. In addition to a Federal credit, nine States also offered conservation incentives so that there is enough data out there and we could actually tease out what effect they had.

In particular, the Federal Energy Tax Act of 1978 provided homeowners with tax credits to encourage conservation investment activities, such as insulating walls and ceilings, replacing furnace burners and ignition systems, installing clock thermostats, and so on. These investments received a credit of 15 percent, with a credit ceiling of $300.

The act back then also encouraged investment in solar, wind, and geothermal energy equipment. These investments received a higher credit of about 30 percent, and that credit was raised to 40 percent in the Crude Oil Windfalls Profits Tax Act of 1980.

Several years ago, my colleague Gilbert Metcalf, of Tufts University, and I gathered data to study the impact of the Federal and State credit programs in research that was funded by the National Science Foundation.

We found that the credits were fairly successful at stimulating conservation activity. While the Federal credit was in effect, for example, we found that between 3 and 7 percent of tax returns claimed the credit in any given year. Cumulatively, between 1978 and 1985, more than 30 million tax returns likely claimed the credit. Thirty million.

Of course, the natural concern one might have was that taxpayers were going to invest in conservation anyway and that the credit had little effect at the margin.

Professor Metcalf and I used econometric techniques to investigate whether the credits had a statistically significant impact at the margin once we controlled for a number of other factors, such as energy prices.

After the dust settled, we found that the credits did contribute significantly to conservation activity, and that a 10 percentage

point credit would likely increase the probability of investing in these home improvements by about 24 percent.

I should add that I would expect something like that to happen if you were to adopt a credit for some other device that allowed people to conserve energy.

As a final note, since the credit was so generous, we also explored whether it was fraudulently claimed. Using IRS audit data, we found that this was not a concern. Almost all of the credit claimed was found to stand up to audit.

The literature on the impact of investment credits on firm behavior also suggest that credits induce a significant response, so you could consider that avenue as well.

While the exact numerical response will clearly depend on the particular circumstances, there is very strong evidence that firms tilt their investments in response to tax incentives.

Typical of the literature is a study I co-authored with U.C. Berkeley economist Alan Auerbach several years ago. Back in 1986, tax incentives for purchases of equipment and structures were changed dramatically as part of the Tax Reform Act.

We found that the mix of investments responded sharply to the changing Tax Code. Investment dropped the most in those assets that received the harshest tax treatment in the Tax Act.

Subsequent studies have confirmed the finding that tax credits often have large effects. That said, it is important to add that the impact of a tax policy is not a reasonable metric of its quality. Indeed, we need to be especially cautious about the application of credits precisely because they are so powerful.

Economics teaches us that targeted tax credits are often a very bad idea. An efficient Tax Code should have as low a rate and as broad a base as possible. When the Tax Code plays favorites, it introduces distortions that can have a very high cost to society.

This is particularly a concern today, when the numerous tax incentive programs that have been folded into the personal income tax, combined with their various phase-outs, have made the marginal tax rate structure bizarrely complex and an efficiency nightmare.

With this warning in mind, it is nonetheless useful, especially at this hearing, to entertain the question: under what circumstances is it advisable to ignore the general result that the Tax Code should not play favorites?

I believe that there is agreement in the literature that those circumstances are very limited to the case where there is a clear externality associated with the activity. For example, if the use of a particular piece of machinery produces pollution as a by-product, then it may be optimal for society to tax that thing.

Such circumstances arise whenever an economic decision by an individual agent has a secondary and important impact on others. The optimal tax can be a subsidy if the external effect is positive. That is why a tax credit for conservation, as was in effect in the 1970's and 1980's, can be a sensible policy.

There are other examples as well outside of the energy area. There are several proposals being considered now, for example, that would subsidize investments in broad-band networks. Since

everybody knows about the network externality of attaching equipment to a network, that type of subsidy may be advisable.

Tax legislation that favors investment in one type of asset over another likely has big effects. This means that the direct economic costs, or deadweight loss, of such policies is likely fairly large.

On the other hand, if the benefits to society of the favored investments are high enough, the policy may still be a good idea. The benefit of lower pollution may outweigh the cost of higher distortion.

In closing, I encourage the committee to weigh carefully and precisely these costs and benefits as it considers new tax credit policies. Thank you.

[The prepared statement of Mr. Hassett appears in the appendix.]

The CHAIRMAN. Well, thank you very much. Thank all of you.

I am going to begin with a provocative question. That is, why do we care? Why do we want to encourage alternative fuel vehicles? Why do we want to encourage alternative fuels? Why not just let the market operate? Why do you want to stimulate alternative fuels and vehicles? Does anybody want to take a crack at that? Why does it matter?

Dr. Lashof?

Dr. LASHOF. Thank you, Mr. Chairman. I think that is obviously a key question. I think that the Energy Policy Act was somewhat misdirected in its targets for alternative fuels because, in my view, alternative fuels are not an end in and of themselves.

Alternative fuels are a means to achieve two key policy goals that I think we should have. One, is to reduce our economy's overall dependence on petroleum. Second, to improve the environmental performance of our transportation system for both public health and with respect to global warming pollution.

Alternative fuels, as well as, particularly, advanced technology vehicles such as hybrid vehicles which can reduce by 50 percent or more the total amount of fuel that is needed, can contribute very significantly to those policy goals, as I tried to review in my testimony.

The CHAIRMAN. So you are basically saying it helps the environment, and also makes us less dependent on foreign sources for petroleum.

Dr. LASHOF. I think those are the key points. One thing to emphasize, is on the environmental benefits, if you are looking at alternative fuels, per se, such as natural gas vehicles, those can depend on where it is applied.

There are huge benefits, for example, in converting bus fleets from diesel to natural gas vehicles or other heavy-duty vehicles that emit huge levels of very toxic pollutant in urban areas where there is a large population, if you are specifically looking at alternative fuels and where those have the biggest leverage for our environment, I would suggest it is replacing diesel trucks and buses that are used heavily in urban areas.

The CHAIRMAN. Anyone else want to comment?

Yes, Mr. Cannon?

Mr. CANNON. Can I just add my concern about infrastructure as being relevant to this debate? When you are looking at hybrid elec-

tric vehicles that are on the market today, the market is working quite well, both the vehicles that are out there, one by Honda and one by Toyota, are selling well without major government involvement. But those two vehicles operate on gasoline. They achieve very important policy objectives, but they do not displace gasoline.

When you get into alternative fuels and technologies that rely on alternative fuels, you do have a fueling infrastructure issue on top of the technology. I think, when you are looking at fuels like natural gas, propane, and some of the other alternatives, methanol, as well, the market needs help, I think, in helping to establish the infrastructure capability for these vehicles as well.

So the market operates within limits, I think, on hybrids, but when you get to some of the alternatives, I think additional incentives are needed.

The CHAIRMAN. Well, that is right. I suppose the goal is to have as little an infrastructure problem as possible. That could mean help to establish infrastructure or it could mean we do not need the infrastructure because we are developing a technology that does not require all these gas pumps in all of these different places where you "fuel up."

Where are we probably headed? You mentioned fuel cells, you mentioned hydrogen, ultimately. With fuel cells and hydrogen, do you need a large infrastructure?

Mr. CANNON. Well, you do. Some of the existing infrastructures that we have could be quite suitable for the transition to the hydrogen fuel cell. For example, most of the hydrogen produced in the world today is produced from natural gas.

So a natural gas infrastructure today can facilitate a transition to a hydrogen fuel cell economy in the future. Ultimately, we want hydrogen to be produced from renewable sources such as solar energy, but a natural gas vehicle infrastructure is an important transitional and enabling technology for the transition ultimately to the fuel cell.

There are other sorts of synergies between transitional technologies and the fuel cell as well, but this is one that I think comes to mind.

Mr. DINNEEN. Mr. Chairman, if I could, just two quick points. One, on the fuel cell issue, in terms of transitional issues, reformer technology that exists today can also make hydrogen out of various liquid transportation fuels like ethanol.

There is ethanol available in all 50 States across the country, so the infrastructure is already available as well. We really do see important market opportunities for ethanol and fuel cell technologies as a bridge to the type of technology that is being discussed.

But in terms of your fundamental question which you opened the panel with, I would just like to make this comment. It is going to sound pejorative, and I do not mean it to be so because the oil companies are our customers and we ought to be working with them, and we are working with them, to provide consumer with high-octane, high-quality motor fuels.

But the petroleum companies are not in the business of throughputting renewable fuels. They are in the business of through-putting hydrocarbons. That is why you have got to encourage, through tax policy and other measures, the use of alternative fuels like eth-

anol to get the public policy benefits that are in the national interest, not necessarily in the stockholder interests of the major oil companies.

The CHAIRMAN. Well, my time has expired. I have got lots of other questions, and we will get to them later.

Senator Grassley?

Senator GRASSLEY. Thank you very much, Mr. Chairman. For all of the panel, outstanding testimony on one of the most important issues facing the Congress this year.

President Bush put his plan out in the middle of May, I believe it was, and there has been constant criticism since then about the plan being too dependent upon petroleum and not having enough concern for conservation and the environment.

Now, I obviously think when half of the President's recommendations on domestic policy and domestic energy deal with conservation or alternative fuels, obviously I do not think that is a fair criticism of the President's program.

I think it is a very broad-based program involving more production of fossil fuels, obviously, but tax credits for conservation, tax credits for alternative fuels, et cetera. It is pretty well balanced.

So, Mr. Dinneen, I want to ask you a question about the press coverage regarding the President's energy program. How do you see the role of alternative fuels, in general, and the role of ethanol, specifically, under the President's plan?

Mr. DINNEEN. Senator, I happen to agree with you. I think much of the criticism of the President's plan is a bit unfair and unfounded. For example, he is often criticized as, this is just an all oil and gas plan.

I think he recognizes the potential of renewable fuels like ethanol. That is why his plan actually includes a recommendation to extend the ethanol tax incentive, as well as other measures to make the use of ethanol as an alternative fuel a bit more viable.

I think the President appreciates that our problem today really is not a lack of crude oil. Our problem today is a lack of refining capacity. Our refiners are operating at 96 percent of capacity today. They cannot keep doing that.

Ethanol is a way of adding volume to that tightly-constrained marketplace in a very effective fashion. Senator Bingaman held hearings a couple of weeks ago in which he heard testimony about some of these issues.

I think, as the Congress crafts an energy policy plan, it is going to be balanced. It is going to be looking at how we can add renewables to the marketplace in a constructive fashion.

Senator GRASSLEY. Also, President Bush, as you know, recently denied California's request for a waiver of the RFG oxygen content requirement. How will this affect the 10 percent alternative fuels goal that we have discussed today, and ethanol ready to meet that?

Mr. DINNEEN. Dr. Lashof mentioned in his testimony that we need to be getting MTBE out of gasoline. I think that is a view that is shared by many, including the State of California. MTBE is contaminating ground water across this country.

Ethanol is a way of adding oxygen to the fuel, displacing toxic aromatics, and reducing emissions without contaminating our

ground water. We do not need to sacrifice clean water in order to get clean air.

What the President did with his decision on the California waiver, I think, was totally in keeping with the law and the science of the Clean Air Act. The EPA looked at the science and concluded that there was no way they could give a waiver of the oxygen requirement under the constraints of the Clean Air Act.

What it means for ethanol, is about 580 million additional gallons of fuel ethanol. So, it is a tremendous market opportunity for farmers across this country, and we are extremely grateful, but extremely challenged by the decision, and we will meet the demand for ethanol that that decision creates.

Senator GRASSLEY. Mr. Cannon, your testimony referred to the Nation's dangerous reliance upon foreign petroleum. What percentage of alternative and renewable fuels would we have to produce every year to make us domestically independent for vehicle usage?

Mr. CANNON. Mr. Chairman and members of the committee, it is a daunting task. I mentioned in my testimony that about two-thirds of our petroleum is currently imported.

I think we have heard testimony today that says that the entire contribution of alternative fuels, including ethanol fuel additives, is a couple of percent of our transportation supply.

So, we are looking at a 20- to 30-fold increase in the contribution of domestically produced fuels and renewable fuels to meet the challenge of energy independence in our transportation sector.

This huge task suggests that we need both energy efficiency and support for all alternative fuels if we are ever to accomplish such a major increase in a short period of time.

If you have a vehicle that doubles fuel economy, you are halfway to your goal before you even start the vehicle, if you are running that vehicle on alternative fuels, because of the increase in fuel economy.

Then if we have a plethora of alternatives, from ethanol, to methanol, to propane, to natural gas, to bring in the market, we can chip away at this 20- to 30-fold increase in supply that we need for energy independence.

Senator GRASSLEY. Thank you all.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you very much, Senator.

Senator Bingaman? We are very honored to have Senator Bingaman here, chairman of the Energy Committee, who is probably one of the experts around here, and team leaders, in trying to figure out what to do about all of this.

Senator BINGAMAN. Mr. Chairman, that does not say much about the level of knowledge we have here in the Senate on these issues, but thank you very much for having this hearing.

I wanted to ask a little bit about hybrid electric vehicles. Mr. Cannon, you were saying that the market is working very well with regard to hybrid electric vehicles, that there is a demand for those. Yet, we have none of them on the market by U.S. manufacturers. How do you explain that?

Mr. CANNON. We do have two vehicles on the market by companies that do manufacture some vehicles in the United States, Toy-

ota and Honda. They have been on the market for about a year and a half.

I do have in my written testimony some sales figures to suggest that the sales of these vehicles are in the 5,000 to 15,000 units per year, which, for this field, is pretty substantial in their opening one and 2 years of production.

So, it is on the basis of that response by consumers that I say that, relative to some other technologies, this industry seems to be coming out of the starting blocks pretty quickly.

Senator BINGAMAN. Well, why have the three large American auto manufacturers not put hybrid electric vehicles out?

Mr. CANNON. Well, the United States has certainly studied hybrid electric vehicle technology through the 1990's at a level of effort that is equal to the investments of this technology by other manufacturers, including Toyota and Honda. So, it is not for lack of attention or analysis.

In addition, every automotive manufacturer, under the PNGV program, has built a prototype hybrid electric vehicle, in our case, powered by diesel fuel. The automotive companies have not moved rapidly, at least compared to Toyota and Honda, to market these vehicles, although they all have announced plans to market hybrid technology within the next two or 3 years.

As to why they have not moved more aggressively into the marketplace given what Toyota and Honda have been able to do, I think perhaps another member of the panel should address.

Senator BINGAMAN. Ms. Cooper, did you have a comment on that?

Ms. COOPER. Yes. I just wanted to say, Senator Bingaman, that I think all of the major manufacturers are working to introduce hybrid electric vehicles into the marketplace.

I think the challenge is, the American auto makers have taken on—in our organization we represent 13 of the global manufacturers, including the American manufacturers—is to introduce that technology into vehicles that are attractive to consumers today that sell in substantially high volumes. That is really the challenge, to add that technology to some of the higher-volume selling vehicles.

Ford, General Motors, Daimler Chrysler have announced, in 2003 and 2004, they intend to introduce hybrid electrics into some of their trucks and sport utility vehicles. Obviously, the challenge there is substantial. I think the billions that are being spent on R&D will be well worth it when those technologies come to market.

Senator BINGAMAN. Mr. Wells, you did not look at the issue of hybrid electric vehicles at all in your study. You looked just at renewable energy alternatives, or alternative energy powered vehicles. Is that right?

Mr. WELLS. That is correct. We had a focus of what was defined in the 1992 EPACT Act as what would be considered as alternative fuels, and that was a point I was going to make.

If you are looking at the progress being made, clearly, because hybrid vehicles were not defined to be qualified as alternative fuels, they were not in any of the counts, in terms of what percentage of use. The hybrid vehicles did not register.

Senator BINGAMAN. Dr. Lashof?

Dr. LASHOF. If I can just add, I think that, although the two models that are on the market now are selling well, they are beating the expectations of the auto companies that introduced them, they are selling thousands of vehicles per month in a market that is selling, what is it, 16 million vehicles a year.

Ms. COOPER. Sixteen to 17 million new vehicles per year.

Dr. LASHOF. So we have a long way to go. The goal of the tax incentives in the Clear Act is to help move the technology from its sort of early introduction phase into truly mass production, where the costs can come down and they can be truly competitive.

I mean, there are strong indications that both Toyota and Honda are internally subsidizing those initial vehicles to establish a market presence, and we commend them for doing that. But that is not sustainable over the long run.

I do not think that Mr. Cannon meant to suggest that he did not support the tax incentives in the Clear Act for the hybrid vehicles as well as alternative fuel vehicles.

Senator BINGAMAN. Dr. Lashof, let me just follow-up with you. I have here a list of recommendations that the previous administration made, the Clinton Administration. They had a proposal for electric vehicles, a credit for electric vehicles, and a credit for hybrid vehicles.

As between hybrid electric running off of gas and hybrid electric running off of hydrogen, I mean, how should that be sorted out? If we were to write incentives into the tax law for people to acquire hybrid electric vehicles, should there be a preference for one over the other, or any way to compare them? What is your thought?

Dr. LASHOF. First of all, let me say, I think the Clear Act—and I commend Senator Hatch for his leadership on this—actually represents a significant policy improvement over what the previous administration had recommended in this area, for a couple of reasons.

It ties the incentive to actual improvements in fuel economy and it includes the strong emission criteria that I mentioned. It is comprehensive in supporting both pure electric vehicles, as well as hybrid electric vehicles that are fueled by gasoline as the basic energy source.

It provides, potentially, a higher tax credit for pure electric vehicles if they achieve extended range. I think that is appropriate, because the technology challenges and the environmental benefits of a pure electric vehicle are greater than for a hybrid electric vehicle.

I think it makes sense to support both, as the Clear Act does. My expectation is that, for the near future, gasoline-fueled hybrid electric vehicles have a much larger potential market than do pure electric vehicles.

Senator BINGAMAN. My time is up, Mr. Chairman. Thank you.

The CHAIRMAN. Thank you, Senator.

Senator Hatch?

Senator HATCH. Thank you, Mr. Chairman. I want to thank you for holding this hearing, and I want to thank each of you witnesses for being here and giving your expert testimony to us. I think it has been great.

Transportation, of course, accounts for nearly two-thirds of the oil consumption in the United States, and we are 97 percent dependent on oil for all of our transportation needs.

When we consider the role that transportation plays in our economy and our way of life, it is hard to believe that we continue to rely on foreign nations for more than one-half of our oil supply.

If our Nation is going to have a strategy for energy security, that strategy must begin with transportation fuels. So, I am in favor of increasing development of our conventional energy resources in the United States.

However, I believe that our energy strategy would be grossly incomplete if we did not also help increase the efficiencies of our automobiles and to increase the diversity of our transportation fuels.

So, that is why we have come up with the Clear Act. I have been particularly gratified with the kind remarks that have been made today by a number of you with regard to that act.

Now, Mr. Wells, you pointed out in your testimony that the U.S. has not achieved its EPACT goals in connection with alternative fuels, largely because of the barriers that have impeded the public's acceptance of alternative fueled vehicles and alternative fuels.

Now, your testimony, as I see it, boils down these impediments down to the basic economic fact that alternative fuel vehicles cost more to buy and to fuel than convention vehicles, and that the infrastructure has largely not been built.

How do you think the Clear Act would help to address these barriers?

Mr. WELLS. Senator Hatch, I apologize for not having read your bill, but I clearly will when I leave the witness stand here. [Laughter.]

The CHAIRMAN. That is clear. [Laughter.]

Senator HATCH. And I expect you to co-sponsor it then, Senator, and all the rest on this committee.

Mr. WELLS. Much of what we talked about in terms of our findings about some of the weaknesses in the existing Energy Policy Act and how they were measuring success was centered on the goals that were being set out and how they were going to be measured.

A lot of things did not get counted that could have been counted. As Senator Bingaman was talking earlier, the hybrid vehicles that have come on the scenes, the focus of the earlier act was to go out and purchase vehicles. That is what was mandated by law that said, this is how you accomplish something.

The Federal agencies have told us that they would love to buy the hybrid vehicles, for instance, but they do not get credit for buying it under the act. So, there were a number of things that could be changed to help in the alternative fuels area.

Senator HATCH. Well, thank you.

Mr. Cannon, let me ask you this question. And I would appreciate it, Mr. Wells, if you would read the act and give us your opinion on that.

Mr. WELLS. Yes, sir.

Senator HATCH. The Joint Tax Committee will likely score the anticipated costs of the Clear Act, in terms of lost revenue to the Treasury, at several billion dollars or more over a 10-year period.

If the Clear Act were enacted as proposed, do you think the economic benefits to society would outweigh those lost dollars to the Treasury and result in an economic win for our country?

Mr. CANNON. Senator, yes, I do. I think it is clear that the health impacts, for example, and the tremendous expenditures of American dollars for oversees oil, have terrible economic consequences for the United States.

This investment, to me, seems very prudent compared to those costs that, although they are difficult to quantify accurately, seem to me to be an order of magnitude, at least, higher.

So I think we are looking at a situation where we have to bite the bullet and recognize that the economic incentives need also to be raised in order of magnitude compared to where they are, but the economic benefits from such a jump will still be an order of magnitude less than the costs that we are inflicting on our society today.

Senator HATCH. Well, thank you.

Ms. Cooper, you mentioned the importance of bridging the gap towards winning broad acceptance among the public of alternative fuel and advanced technology vehicles in order to jump-start the market penetration.

As you know, the tax credits in the Clear Act are temporary. They are designed to meet that goal of jump-starting the marketplace acceptance of these type of vehicles.

At what point in public acceptance and market share of these vehicles will auto manufacturers be able to take advantage of the kind of economies of scale that would allow these vehicles to stand on their own without a tax credit?

Ms. COOPER. Well, Senator Hatch, in some cases, that is a very difficult question to answer, as I am sure you are aware. But I think, because the new technologies are more expensive than conventional vehicles with which they compete, we really do need that kind of tax credit.

There is a rule of thumb that, for some niche vehicles, it would take 30,000 vehicles being manufactured for that vehicle to be acceptable for continued growth and volume development.

For a mainstream vehicle, it would be about 100,000 vehicles that would make it a long-lasting vehicle. The time to get there is very difficult to predict, how much help you would get.

But I think we look at the Clear Act and the time constraints there as being a viable way to begin the process, to really jump-start it, boot-strap it, if you will, in military terms, and that being the way to get the process started and really determine the market demand and how acceptable these vehicles would become.

Clearly, the more transparent the advanced technology vehicles are to the public, the more likely they are to purchase them. If the costs are pretty comparable to a conventional compared vehicle, they are going to buy them. That is what we really believe to be the way to go.

Senator HATCH. Well, thank you. I have a number of other questions. I wish I could ask them of all of you because you have all

given excellent testimony today and I have really appreciated it, but I will submit those in writing. Thank you all for your kind testimony.

[The prepared statement of Senator Hatch appears in the appendix.]

The CHAIRMAN. Thank you very much, Senator.

Senator Lincoln?

Senator LINCOLN. Thank you, Mr. Chairman. I certainly appreciate the series of hearings that you have produced here for the committee on the role of tax incentives in our energy policy in this country. It is certainly time that we address it.

I would like to focus this morning on the use of alternative fuels and the many benefits, including environmental as well as reduced dependence on fossil fuel.

I would also like to ensure that, as we focus on these Federal energy tax incentives, that we look to make sure that they are performance-based and follow a few simple guidelines.

Increased efficiencies, incentives for conservation, and certainly reduced dependence on oil, opening up our electric markets, and providing support for low-income citizens who may be inadvertently affected, especially in our rural States, as the Chairman and I focus on.

But, in particular, ethanol production. Mr. Dinneen. Is that correct?

Mr. DINNEEN. Yes, Senator.

Senator LINCOLN. I would like to talk about ethanol production from rice hulls and rice straw. I know we have seen a great deal of talk about ethanol in the midwest.

I have noticed that there is only one ethanol plant under construction in the United States that would actually utilize rice hulls. Now, you have got some for rice straw under construction in California, but specifically the use of rice hulls in the production of ethanol.

Basically, where are we on the technology curve of widely using rice hulls and rice straws for ethanol and what are some of the specific barriers in using rice hulls and rice straw?

Mr. DINNEEN. Well, Senator, you can produce ethanol from virtually any agricultural feed stock, anything you can get sugar from. Rice hulls would be one of those that you could ultimately get ethanol from. It is a question of economics.

In my testimony I talked about the fact that, as the ethanol industry continues to grow—and we are indeed expanding rapidly—you are going to see ethanol production expand beyond the base in the midwest and beyond the traditional feed stock of corn. I cited in my testimony a number of examples where there are ethanol production facilities going into the ground right now.

You mentioned the rice straw facility in Gridley, California, but there is also a municipal solid waste plant in New York and other plants across the country that are using non-grain feed stocks. The industry, clearly, is going to grow that way.

Whether or not rice hulls ultimately become a viable feed stock, is really going to be a question for the marketplace to decide. I think that it probably will because the demand for ethanol is going

to grow to such an extent that I think many feed stocks are going to be necessary.

But on one point, if I could, because in your opening you alluded to the fact that ethanol is not shipped via pipeline, and that is somehow a marketplace barrier. In fact, ethanol is sold in virtually every State in the country today. While it is not shipped in pipelines today, it could be shipped that way.

Senator LINCOLN. But it would have to be shipped separately.

Mr. DINNEEN. Yes. You would have to ship it as a separate gasoline blending component.

Senator LINCOLN. Right.

Mr. DINNEEN. If the demand is great enough, though, you may see that happening. In Brazil, a country that uses ethanol in virtually every gallon of fuel that is sold, ethanol is pipelined across the entire country.

In California, because you mentioned that specifically, ethanol is going to be used as a replacement for MTBE in California. The suggestion has been made that, because ethanol is not pipelined, that that is somehow a barrier. People sometimes forget, I think, that 90 percent of the MTBE that is used in California today is imported, imported from either Saudi Arabia or from some in the Gulf Coast. There are no pipelines that go from the Gulf Coast shipping MTBE to California, either.

Senator LINCOLN. It can't be added as an additive prior to putting the fuel in the pipeline, right?

Mr. DINNEEN. But there is no pipeline that goes from the Gulf Coast to California with gasoline, MTBE, or gasoline blended with MTBE. The MTBE that is used in California today is shipped via vessel, the same way that ethanol would be shipped to the State.

In fact, because ethanol has twice the oxygen content of MTBE, we think it is twice as good as MTBE because of that. We only need half as many vessels. So, there is just no question that ethanol, logistically, is going to be able to get to the State of California, or anyplace else in the country.

Senator LINCOLN. But all the more reason that we should look at regional solutions in producing ethanol.

Mr. DINNEEN. Absolutely.

Senator LINCOLN. I guess I am looking for suggestions you have in terms of specific incentives that we should use to expand the range of any biomass to use for ethanol. I would appreciate your input, and others', in terms of how we are going to increase those incentives in all those areas.

Yes, Doctor?

Dr. LASHOF. Yes, if I could. I think you mentioned in your opening that tax credits should be performance-based, and I think there is an opportunity here with the ethanol tax credit to improve the environmental benefits we are getting from a given dollar of expenditure by phasing in a program where we do make it more performance-based, so we are linking the amount of the credit to the net benefits in terms of producing petroleum consumption or fossil fuel consumption and global warming pollution.

The cellulosic biomass-based ethanol, whether it is agricultural waste, rice straw, or municipal solid waste, as has been mentioned, clearly have much better overall fuel cycle benefits than the grain-

based ethanol, and I think we should find ways to encourage a movement in that direction.

Senator LINCOLN. Not to mention, we would eliminate the problems of burning off of rice straw and the environmental problems we have in rice straw disposal.

Ms. COOPER. From the auto makers' perspective, we would just like to make sure that the fuel quality is excellent. With our sophisticated emission control technologies and fuel efficiency approaches, that makes it much better for us if the quality of the fuel is substantially improved from where it is today.

Senator LINCOLN. Right. Thank you very much.

The CHAIRMAN. Thank you, Senator.

I have a few more questions. I do not know if you, Senator, have more questions to ask. But I see Senator Dayton sitting in the audience, and he has been sitting very patiently.

Senator, if you want to come up to the dais here, you can ask questions, too, if you want.

Senator DAYTON. I am supposed to answer them.

The CHAIRMAN. All right. Fine.

I am a little concerned with one of your last statements, Dr. Lashof, about the difficulties in grain-based alternatives, or renewable resources for ethanol. I was going to ask both you and Mr. Dinneen about wheat. We have got a lot of that in our State, and other States, and the price is low on the market.

As I understand it, about 25 cents on the price of corn is attributable to ethanol, and that would sure make a big difference—something similar—to the wheat producers. So what is the future of wheat?

Mr. DINNEEN. Well, I think there will be ethanol production from wheat. I think when Dr. Lashof was suggesting that the fuel cycle benefits of cellulose are greater, he is talking about global warming benefits, essentially.

As you produce ethanol from cellulosic materials, you do not have some of the energy inputs in terms of growing grain. But that does not suggest, and I do not think Dr. Lashof intends it to suggest, that ethanol production from grain is not beneficial in terms of greenhouse gases.

Argonne National Laboratories, last year, did a very comprehensive study and determined that the production of ethanol from grain is 35 percent energy efficient, so it is reducing greenhouse gases. If you produce ethanol from other feed stock, cellulose, you are just going to expand upon those benefits. It is, indeed, better in terms of global warming.

How close are we to the technology necessary for wheat-based ethanol?

Mr. DINNEEN. Well, the technology is there. It is sort of a question of economics, again. One of the reasons why corn has been the primary feed stock today, is because of all the by-products that you get from corn.

When you produce ethanol, Mr. Chairman, as you know, you are not just taking a bushel of corn and making ethanol, you are also making a variety of co-products, feed products, that go into the marketplace. Corn has a number of highly beneficial and very valuable co-products that make the production of ethanol from corn the

most economic today. You also get feed co-products from wheat, but they perhaps are not as valuable.

Again, as the industry grows, you are going to see a lot of production from a number of different feed stocks. I think, as there once was ethanol production in Montana, you will see it again.

The CHAIRMAN. Mr. Cannon, you mentioned, I think in answer to Senator Grassley's question, that it might take a 20- to 30-times increase in alternative fuels and vehicles, particularly fuels, to put a significant dent in the barrels of oil that we are importing.

Is that correct? Did you say something like that, about a 20- to 30-times increase in the use of alternative fuels before we are going to be somewhat independent?

Mr. CANNON. Mr. Chairman, I think I said that was more or less what it would take to totally displace oil imports.

The CHAIRMAN. Oh, totally. Totally.

Mr. CANNON. To totally displace. Of course, it all depends on exactly where our base is, because it is small. If we are off by a little bit, then it is 15 times. If we are off by a lot, then it is 30 times.

But to give an element of scale, we have come out of the starting blocks with this industry in the last 10 or 15 years, and I am not a doomsday or gloom and doom type person here, but the fact is, we have an industry, the automotive industry and the oil industry, and they are basically the largest industries this world has ever seen. To challenge them in the marketplace is going to take a long time and a significant growth in production.

In the year 1900, the number of horses in this country used for transportation outnumbered the gasoline-burning vehicle by approximately the same percentage that we have today of gasoline vehicles outnumbering alternative fuel vehicles. Of course, that market transition occurred rather rapidly, as we know.

The CHAIRMAN. Mr. Wells, you mentioned that the low price of crude, $20, even up to $40 a barrel, does not make a significant difference in the alternative.

What would the price of crude have to be, in your judgment, to make a 20, 30 percent increase in the purchase of alternative fuel vehicles, or the use of alternative fuels, generally?

Mr. WELLS. During the course of our work we repeatedly asked that question to anyone in the Department of Energy or EIA. The answer we got back, was that they could not manipulate the model at a high enough level to ever get at a break-even point under the current scenario on price. The price of oil could not get high enough in the model.

The CHAIRMAN. Two hundred dollars a barrel?

Mr. WELLS. The model did not accommodate that number.

The CHAIRMAN. It did not have the parameters.

Mr. WELLS. It did not have the parameters to calculate it.

The CHAIRMAN. All right.

What is your gut guess?

Mr. WELLS. I can tell you that GAO has looked at this three or four times, 1984, 1997, in the year 2000 we just completed the study. We continually are being asked, can alternative fuels make a dent in our independence on energy security?

The answer we keep coming up with is that the volumes currently are so low, less than 3 percent, that you cannot make any significant contribution for independence.

The CHAIRMAN. Let me ask a far-out question. Assuming we are independent because of alternative fuels, what would the environmental benefit be, Dr. Lashof?

Dr. LASHOF. I think that depends on the source of the alternative fuels, particularly. If we are switching to, say, natural gas as the primary alternative fuel——

The CHAIRMAN. The most probably alternative fuels.

Dr. LASHOF. I guess it is hard for me to imagine us becoming energy independent——

The CHAIRMAN. Let us say half.

Dr. LASHOF [continuing]. With just alternative fuels. My point was, I think we can get there, but we have to have much more efficient vehicle fleets so the total amount of fuel, whether it is conventional gas or alternative, has to be driven way down. I think we can do that with hybrid vehicles and fuel cells.

The CHAIRMAN. Assume both. Assume both.

Dr. LASHOF. If we do that, I think over the medium term, natural gas and ethanol produced—and I have to come back to this a little bit. Wheat is great stuff. You can make bread from it, you can make beer from it, you can make ethanol from it. But if you can make ethanol from agricultural wastes, that is stuff you cannot make bread from.

So if you really want to expand the volume of ethanol significantly to make a big contribution to eliminating imports of petroleum, you are going to have to get onto a system that uses nongrains to produce ethanol in large volumes.

I think if you do that, there would be very substantial benefits, as much as 100 percent elimination of the greenhouse gases, for example, over the fuel cycle of producing ethanol if you use these cellulosic biomass type materials.

The CHAIRMAN. Now, this panel is on the use of alternative fuels in vehicles. What about incentives for conventional fuel? If we have got an energy crisis, what do you think? That works against those of you who are advocating greater use of alternatives, as it gets to price. Do you think this Congress should also look at incentives for conventional fuel exploration and development, refinery capacity, et cetera?

Mr. CANNON. Mr. Chairman, I think in the incentives for hybrid electric vehicles you do have the basis for an extension of some of the concepts of the Clear Act to technologies that continue to use conventional petroleum fuels.

If you are tying incentives to fuel economy, to emissions, to advanced technology, you still have included conventional fuel-burning hybrid electric vehicles within the framework of a tax incentive-based program.

So, I think with those caveats of having these performance requirements tied to it, incentives do not necessarily have to totally exclude conventional fuel use to help us achieve some of our policy goals.

The CHAIRMAN. Dr. Lashof?

Dr. LASHOF. Mr. Chairman, if your question is going to, should there be incentives for domestic production of conventional fuels——

The CHAIRMAN. Right.

Dr. LASHOF. I do not believe that is justified because we are talking about, one, a very mature industry, the oil and gas industry. Two, an industry that is responding very rapidly to the higher prices that we are seeing now.

In fact, part of the problem that we are in terms of the conventional fuel supply today was driven by the fact that the market had driven prices down so low a couple of years ago that there was very little investment in domestic oil and gas production.

That has completely turned around. Now every available rig is in the field drilling for oil and gas. There really is no evidence that either constraints on access to public lands or cost is constraining domestic supply, other than geology. The U.S. just has only 3 percent of the global reserve.

So, I do not think you have a policy justification for incentives for conventional oil and gas development that you have in the alternatives area in terms of environmental benefits or economic benefits.

The CHAIRMAN. Anybody else want to take a crack at that?

Ms. COOPER. If I could offer one comment. One of our colleagues in the Highway Users Alliance has conducted a study that really does demonstrate that congestion mitigation at some of the Nation's worst intersections around the country could, over the next 20 years, if they were modified through highway improvements and the like, could save $20 billion gallons by 2020.

I think all of the energy policies that we are considering really have to look very broadly across the board and not just at one sector or another, but a very broad policy look.

There are many ways to save fuel: alternative fuels, advanced technology vehicles, different approaches, and congestion mitigation. I am sure my colleague here next to me would really tap the benefits of some of those approaches, if you are really looking for those kinds of things.

The CHAIRMAN. Do any of you want to comment on that?

Mr. RUANE. I would agree with Jo Cooper's comments. I was going to note the striking parallel with environmental capacity issues that we are talking about today with transportation construction capacity issues. There is a parallel with the ability or inability of the industry to get projects online, the time it takes to build a refinery.

I think it is incumbent upon the Congress to look closely—and I think the President's energy policy address this—at the time it takes to build these refineries and the need, not to waive environmental regulations or ignore the laws, but find a way to streamline the process so these projects get built quicker, so this capacity gets brought online.

That, in itself, is an incentive. If the industry knows that it can get the projects done in a more accelerated way, I think that will influence the way they approach their investments here. So, I would urge this committee to look at that, as well as the Energy Committee.

As far as congestion relief, I am struck by the parallel in another way of the comments of colleagues on the panel here this morning, the mention of lack of infrastructure for ethanol.

The same thing applies, of course, as you well know, with transportation and not maintaining the infrastructure or expanding it is hurting the transportation part of the economy, and our overall economy, as well as it is the ethanol production.

So, I would commend again, Mr. Chairman, your leadership, and going back to your opening remarks, Senator Grassley, and your willingness to take the lead in urging the transfer of the 2.5 cents back to the general fund. I was very glad to hear Mr. Dinneen's endorsement of that idea. I think that is a significant first step.

Just making the Congress mindful of the impacts of its decisions, as you said in your opening remarks, so that this is not in a vacuum, that we need to be aware that, you set a policy here, it affects other sectors of the economy. I am very confident, based on this hearing and your personal leadership in this, that the Congress will be much more sensitive to that in the future.

The CHAIRMAN. Thank you very much, Mr. Ruane. I appreciate that.

Has anybody done a study of some kind to see—I do not know how you would do this—how tax benefits for the conventional energy industry compared with the alternative industry, maybe on a BTU basis, reduced versus saved? Something, or some comparison. As Mr. Hassett knows, there are a lot of provisions of the Code.

Mr. DINNEEN. Mr. Chairman, I know that Senator Harkin, probably about a year ago, had requested that kind of a study from GAO. I will try to dig it up and submit it for the record, but perhaps your other witness could do that, too.

The CHAIRMAN. All right. I appreciate that.

Just to finish up here, some of you said today, 2001, is a real opportunity. So let us think big here a little bit. If you had carte blanche, who wants to take a crack at it?

What could we do here in July, 2001 in this Congress, for this country, to help assure a reliable, cheaper, more efficient source and use of energy looking toward efficiencies and environmental reductions of pollution, et cetera? There are lots of ideas, a lot of technologies, there is the Clear Act. It is very comforting to hear a lot of you supporting that act.

Does anybody else have a burning statement that he or she would like to make because you think that this is what we really need to do to get this country going? Mr. Cannon?

Mr. CANNON. Enunciating the vision, is what comes to mind. I think the Clear Act has many, many of the critical provisions that we need. The one thing that seems to be absent from the debate, or underscored, is the vision of the transportation transformation that is under way. I used to comment before about oats to oil for the last energy transformation, but I see this really as a larger, two-century transition from horses to hydrogen.

If we are taking a transportation system based on a four-legged animal and changing it, transforming it into a sustainable, renewable energy, pollution-free, infinite supply transportation system that maintains the level of transportation mobility that internal combustion and oil have provided us in the 20th century, but carry

it forward to the 21st century, I think this vision could help capture some of the excitement that I feel in this energy transformation.

I view it very similar to computers. We are still in the age where we are thinking that the electric typewriter might be better than a computer, and there was a point somewhere in the early 1980's that, all of a sudden, everybody got it. Not to put down the typewriter, but the computers were really better.

I see this energy transformation as a move, just like from horses to the gasoline-burning vehicle, to the better. That vision belongs, of course, in the preamble of these bills. It belongs at the executive office. It belongs in the public arena. I think the public would respond to that, and we can speed up the time when they get it.

Computers work. When do I get one? That is what we need to have happen with these new technologies for transportation. This is not a step back. Oh, they work. This is where the world is going. When will I be able to get one?

The CHAIRMAN. For you, it is horses to hydrogen. What are some of the other visions on the panel?

Ms. COOPER. Mr. Chairman, the one thing that I would add to what my colleague just said, is there is a lot of excitement and enthusiasm. We in the automobile industry are on the brink of these new technologies.

But I think we must not forget that we have to have consumers as a part of the formula, whatever we do, because we can set all the public policies in the world.

If you do not bring consumers in, if they are not buying the products and driving the vehicles, or whatever the forum is, then you are not going to get the benefit. You are not going to achieve the vision.

If you go back and look at, is the primary objective to support energy security and diversity, if you look at that, we have not achieved our goals in many ways because we really have not brought the consumer along. I think that is very important.

The CHAIRMAN. Well, that is a very good point. I think that is implicit in Mr. Cannon's statement when he said that, gradually, computers gained more consumer acceptance.

Ms. COOPER. Exactly.

The CHAIRMAN. Mr. Wells?

Mr. WELLS. Mr. Chairman, I think we have heard a number of things today that sound like things that are kind of like the good and the bad, the good being that we have heard things that might help leadership of consumer attitude in terms of improvement, technology development, even conservation, which we would tend to agree is good.

The readings that GAO has done look toward very conservative approaches towards tax incentives and the bad part is a word of caution to kind of look before you leap, know what you are buying and how expensive it is, and along the lines of, could we ever be independent, could we totally do away with subsidies petroleum?

While all that may be political, although very difficult to achieve, one would have to assess the cost of the economy in terms of the impact, in terms of what it would cost to achieve total independence.

The CHAIRMAN. That is correct. I do not think anybody is advocating total independence, either. I think that is unrealistic. Maybe a little less dependence.

Mr. DINNEEN. Mr. Chairman, one of the things that I think is critically important, is that people do, in fact, recognize the potential to move away from a hydrocarbon economy, if you will, to more of a carbohydrate economy. Our country has tremendous carbohydrate resources that can be used to produce ethanol.

Not necessarily to be a segue to your next witness, but quite frankly, there is one State in the country that is meeting EPACT goals today, and it is Senator Dayton's great State of Minnesota. Ten percent of Minnesota's fuel is, indeed, renewable-based ethanol, and they now have a new program to promote bio-diesel.

Recognizing that there are opportunities to promote renewable fuels, to move us away from simply a greater and greater reliance on petroleum, can be done through research, though tax incentives, and other programs like those that are being promoted in the State of Minnesota, can do that.

The CHAIRMAN. Well, thank you very much. This has been very helpful. We have a long way to go here, but I deeply appreciate your assistance. This has been very helpful. Thank you for the time and effort that you have undertaken to prepare, to be here, and help the cause.

Now we will turn to the Senator from Minnesota, Senator Dayton. Thank you, Senator, for being so very, very patient. We appreciate that very much.

We are very honored to have you here, Senator. With your patience, you have learned a lot and listened to the testimony.

Senator DAYTON. Yes. It was very worthwhile.

The CHAIRMAN. Thank you for coming to help us.

Senator DAYTON. Of course, you know that the decline in the combined expertise from the first panel to the second is rather precipitous, you see.

The CHAIRMAN. No, it is ascending.

Senator DAYTON. I am also relieved in the way that Senator Hatch has departed, because I have not read the Clear Act either. I no doubt will have the opportunity to do so soon. But, thank you.

STATEMENT OF HON. MARK DAYTON, A U.S. SENATOR FROM MINNESOTA

Senator DAYTON. I do appreciate it, Mr. Chairman. Thank you very much for, on short notice, giving me the opportunity to testify before you here today, and to talk about tax incentives for alternative fuels.

As one of my predecessors said, and I appreciate the compliment, Minnesota has been a long-time leader in the production of renewable fuels such as ethanol, wind-generated electricity, biomass, solar energy.

As a result, we have seen firsthand—and I did as Commissioner of Energy and Economic Development in the State back in the 1980's—the really important role that Federal and State tax incentive have played, and I think will continue to have to play in developing these industries during their infancies.

I strongly support legislation to extend and expand the Federal tax incentives for ethanol, wind, biomass, and other renewable fuels, which I know you have championed in your tenure.

Last month, Mr. Chairman, Senator Tim Hutchinson of Arkansas and I introduced legislation to provide tax incentives for increased use of bio-diesel, a renewable fuel made from soybean and other vegetable oils. Bio-diesel can be blended in different amounts with conventional diesel fuel or used as a complete alternative.

Its use will reduce our reliance on foreign oil, increase demand for farm products thus boosting their market prices, and provide for a cleaner environment. In other words, this is a legislative grand slam.

Bio-diesel is a home-grown renewable fuel. Even as world oil prices are tightening, America's farmers are producing record crops of soybeans. Unfortunately, U.S. soybean prices are now at 20-year lows.

Building demand for bio-diesel will help increase these commodity prices while enhancing our Nation's energy security.

As we increase demand for soybeans, thus boosting those market prices, we are also investing in the economic well-being of farmers and rural communities across our country.

I know, Mr. Chairman, you know from your State how vital the agricultural economy is to the well-being of everyone else.

Our legislation's goal is to expand the markets for bio-diesel from 20 million gallons to 200 million gallons annually. The U.S. Department of Agriculture estimates that such an increase in bio-diesel sales will increase soybean prices by at least 25 cents per bushel. As market prices go higher, as you well know, the cost of government price supports become lower.

In addition then to higher prices for farmers and lower taxpayer subsidies, our proposal will cause no reduction in Federal Highway Trust Fund revenues. Our bill provides Federal excise tax credits of 3 cents per gallon for 2 percent bio-diesel and 20 cents per gallon for 20 percent bio-diesel.

Our bill provides that the Commodity Credit Corporation reimburse the Federal Highway Trust Fund for its lost revenues.

In conclusion, Mr. Chairman, this legislation is good for America's farmers, for our rural economy, our energy security, and the environment. I ask that you and your committee incorporate it into any energy tax legislation reported out of this committee.

Thank you, Mr. Chairman.

[The prepared statement of Senator Dayton appears in the appendix.]

The CHAIRMAN. Well, thank you very much, Senator. We do not have any soybeans in my State, so I did not know much about bio-diesel as an alternative fuel.

Senator DAYTON. I was sort of glad not to have the competition. We have got too many of them in Minnesota.

The CHAIRMAN. And some other States, too.

Senator DAYTON. Right.

The CHAIRMAN. But that is very interesting.

If I might just take an advantage of the opportunity of you listening to some of the earlier testimony, if you have any thoughts,

Senator, on where we should go from here in developing alternative fuels, as well as vehicles.

Senator DAYTON. Well, Mr. Chairman, I commend you for your foresight. I think it is very hard to sustain the kind of fundamental shift in practices without some external imperative to do so.

Harry Truman once said, "If you tell the American people anything they go crazy, if you tell them nothing, they go fishing." We are guilty of that.

Twenty years ago when I was Commissioner of Energy and Economic Development in Minnesota and we had then still the taste of an energy crisis, then we had an interest in these alternatives. Then as the prices became stable, that interest waned. So we are still dabbling in these alternatives, in my view, even in Minnesota.

I appreciate the commendation. I was not aware that we were ranked first among the States, but that just proves to me how far we have to go.

My office just bought a vehicle in which we wanted to use an 85 percent ethanol blend in the engine. We asked the salesman when we picked it up if it was suitable for that, and he said it was.

Then we found, when it came in for its first check-up, that was not the case. Well, there is a breakdown there because there is a salesman who had a willing customer and did not have the level of expertise themselves to be able to make the correct referral.

So, we are sort of hit-and-miss. Even the ability to get all over our State in all weather conditions is something that has improved, but is still something that people that are relying on these fuels have to plan ahead for.

Bio-diesel, for example. There is a real concern to the trucking industry that it be reliable under all kinds of weather conditions. Certainly, as you know, going across Montana or Minnesota in the wintertime is very, very different from going across Louisiana or Texas in the summertime.

So, as we said before, we need to really demonstrate to consumers across the country that these fuels are reliable. We need the tax incentives, frankly, to make them affordable.

I am distressed if the equation is such that these fuels will never be economically competitive, but I think if you look at the broader picture—and you are well aware yourself of the crisis afflicting American agriculture with over-production—if we look at the entire equation of the benefits of higher commodity prices, higher domestic consumption of these commodities, and therefore lower taxpayer costs, we have to factor those savings into the cost of these tax incentives, and then the long-range goal. But I think it has to be a comprehensive policy. We have to commit to it and then we have to stick with it.

The CHAIRMAN. Well, we have got a lot to do. The good news is, we are a very vibrant country. There is more opportunity, more mobility in this country than any other in the world, and we will find a way to make it work. Thank you.

Senator DAYTON. I commend you, Mr. Chairman, for using your chairmanship of this committee to proceed.

The CHAIRMAN. Thank you very much, Senator. I deeply appreciate your contribution.

Senator DAYTON. Thank you.

The CHAIRMAN. Thank you.

The hearing is now recessed.

[The prepared statement of Senator Rockefeller appear in the appendix.]

[Whereupon, at 12:11 p.m., the hearing was recessed to reconvene on Wednesday, July 11, 2001.]

THE ROLE OF TAX INCENTIVES IN ENERGY POLICY

WEDNESDAY, JULY 11, 2001

U.S. SENATE,
COMMITTEE ON FINANCE,
Washington, DC.

The hearing was convened, pursuant to recess, at 10:04a.m., in room 215, Dirksen Senate Office Building, Hon. Max Baucus (chairman of the committee) presiding.

Present: Senators Breaux, Graham, Bingaman, Lincoln, Grassley, Murkowski, and Nickles.

OPENING STATEMENT OF HON. MAX BAUCUS, A U.S. SENATOR FROM MONTANA, CHAIRMAN, COMMITTEE ON FINANCE

The CHAIRMAN. The committee will come to order.

This is the second in a series of hearings on the role of tax incentives in energy policy. Today we consider issues relating to energy supply and demand, or production and consumption.

First, we will hear from Jay Hakes, who has a long history in energy policy as a former Administrator for the Energy Information Agency. I might add, he also has a long history with others on the Hill, Senator Graham, I understand, and Senator/Governor Chiles. Is that correct?

Dr. HAKES. Yes, and a little bit for Senator Chiles.

The CHAIRMAN. To some degree. Well, we are very happy to have you here, Mr. Hakes. I understand you are going to suggest some criteria for evaluating tax incentives.

Then we will hear about tax incentives and disincentives in the oil and gas industry. This will include a proposal to keep small refineries in business and help them address the costs of complying with very important environmental rules.

Some might think the plight of small refineries is a small issue. I disagree. Small refineries, like the Montana Refining Company, play an important role in supplying our Nation's energy needs. I am eager to hear how the Tax Code might be used as a tool to keep this important sector healthy.

We also will hear about alternative energy sources, such as renewable energy, which is used to supply electricity. I am pleased to note the leadership of Senator Grassley on this issue, and look forward to working with him as we consider how the Code might further develop renewable energy.

We also will hear about ways that the Code might be used to reduce demand for electricity, particularly through new technologies, that can be used to replace traditional electricity supply.

I know in my State of Montana businesses are interested in fuel cell technology, and I look forward to hearing about prospects of this, and other, technologies.

Some of these ideas may seem like they have been around for a long time. In many cases, they have. President Carter proposed tax incentives for energy conservation, so did President Clinton. Now President Bush has proposed several tax incentives for an alternative and renewable energy supply and to reduce demand.

Although some of the ideas are not new, we may be in a situation where we finally can find the political will to put them into action.

Again, I thank Senator Grassley for his help in organizing this hearing.

Senator?

OPENING STATEMENT OF HON. CHARLES E. GRASSLEY, A U.S. SENATOR FROM IOWA

Senator GRASSLEY. Thank you very much. As many of my colleagues know on this committee, I appreciate very much Chairman Baucus' leadership in this area on a very important issue that now has become much more of an issue because of the situations in California on questions about electrical generation and the quantity of it, and in the Nation as a whole from the standpoint of the high cost of gasoline, diesel, and fuel oil for heating.

So, it is very appropriate that we get moving in this area of energy policy and the changes of public policy that are needed to enhance our conservation and enhance our production.

Very much, the hearing today is connected with alternative and renewable sources of energy that are a way of not only increasing our energy independence, but a way of protecting our environment at the same time. Wind, biomass, and ethanol are alternative energy sources that, with my continued support, are working to reduce our Nation's dependence upon foreign oil.

Renewable energy makes perfect sense. Think about it: the wind is a clean, abundant natural resource. Successful harnessing of wind power can help provide energy in times of shortages and alternative sources in the face of soaring prices.

My State of Iowa is a major producer of wind energy. Experts in the area say that we rank 10th in the 50 States regarding the potential of harnessing wind energy. Right now, with the production facilities we have, we are actually 3rd of the 50 States in actual generation of electricity from wind.

In fact, Iowa has four new wind power projects ready to go online just this year in addition to the ones that are already online.

Nationwide, more than 900 megawatts of new wind energy capacity was added just last year. This new capacity alone will power the equivalent of more than 240,000 homes.

In 1993, I introduced the first-ever bill to give wind tax credit for production of electricity so it could begin to compete with traditional energy sources. I believe that a production tax credit is critical to the expansion and development of wind energy and the future increase of electricity production.

The credit is set to expire at the end of this year, so I have introduced a bill called by the acronym BREEZ to extend the wind en-

ergy production tax credit through the year 2007, and it has 23 co-sponsors in the Senate. I believe this is a wise investment.

Also, I have introduced legislation to encourage and expand our production tax credit for electricity produced from renewable biomass. So, under the acronym of GREEN, my GREEN bill has been co-sponsored by 12 of my fellow Senators to extend the credit for electricity production from biomass until the year 2007.

Biomass energy production will produce enormous economic benefits for rural America because I know that farmers do not waste anything. They extract value from every resource. Turning tree trimmings and native grasses into energy is one of the many ways farmers can use their land for public good, and also profitability. This is something that the Tax Code should encourage.

Equally important is increasing and diversifying our domestic energy production and advancing renewable and alternative sources in addition to wind, biomass, soy, diesel, and ethanol. We must continue to develop renewable and alternative energy sources as an integral part of our National energy policy.

First, alternative and renewable sources enhance our energy diversity, thereby providing the United States with insulation from oil supply dominated by the Middle East. Our national security is currently threatened by heavy reliance upon foreign sources of oil.

Second, domestically produced alternative energy creates American jobs and strengthens our economy. Finally, alternative energy makes valuable contributions to maintaining cleaner air and, thus, a cleaner environment.

I look forward to the testimony that we are going to hear from these experts, five people in the field, each of these working very much over a long period of time to become experts and are well sought out for their opinions.

The CHAIRMAN. Thank you very much, Senator.

We are joined today by several members of our committee, including Senators Breaux, Graham, and Bingaman.

I understand, Senator Breaux, you have a brief statement you would like to make.

OPENING STATEMENT OF HON. JOHN BREAUX, A U.S. SENATOR FROM LOUISIANA

Senator BREAUX. Just a short one, Mr. Chairman. I would just congratulate you, first of all, for having this hearing. It is interesting that the Finance Committee really has an opportunity to make a major impact on energy in the sense that we are privilege to have on our committee yourself, who has a real understanding of this, as well as Senator Grassley, but also the chairman of the Senate Energy Committee, Senator Bingaman, who is also on this committee, as well as the Ranking Republican on the Energy Committee, Senator Murkowski, who also sits on the Finance Committee.

So, we have within this committee, I think, the wherewithal to really come up with a comprehensive energy plan, working with the Energy Committee, obviously, to try and combine the features of what this committee can do from a tax policy, but what they can do on sort of a policy-oriented theme that they would have responsibility for over on the Energy Committee.

We have a mess in this country. The reason we are here today is because of that mess. We import 55 percent of the energy that we consume in this Nation. If we imported 55 percent of the food we eat in this country, people would be marching in the streets saying it is totally unacceptable.

Energy is certainly as important to our National security as food, if not more so. The military cannot operate without it, society cannot operate without energy. Yet, for far too long we have found it acceptable to allow foreign countries, many of which are not our friends, to control the price of energy that we consume in this country.

If the people in OPEC, which is a cartel that fixes prices, operated in this country they would go to the penitentiary because what they do is illegal. But we have been satisfied, through many administrations, that that is an acceptable way of dealing with energy policy in this country, and it is not.

As long as we say it is all right for OPEC to continue to regulate the prices, we are going to continue to have the problems. There are some things we can do as a committee.

I certainly support and have introduced a tax credit for marginal oil and gas production, as well as the geological and geophysical expensing incentives. All of those are important, but they are not going to solve the problem.

They ought to be flexible. They ought to kick in when the price goes below a certain amount, and go away when the price of the market allows for this exploration to occur.

A final note. We cannot continue just to say no to exploration in this country. I mean, everything from Canada to Key West is off limits in the Atlantic. Everything from Mexico to Canada on the west coast is off limits.

Now we see the administration has cut at least Site 181 by 75 percent. Three fourths of a sale in an area where we have had oil and gas production ongoing for 60 years, and now there has been a determination that we have to cut it by 75 percent. We cannot have everything only one way.

But I thank you, because this is an important hearing. Hopefully, out of this committee we can have some actions taken that will help increase production in a fair and balanced fashion. Thank you.

The CHAIRMAN. Well, thank you, Senator, for that important statement. I think you have made some very important points, which I think a lot of us should think about more seriously and take to heart. Thank you very much.

Senator Murkowski, I understand you have a brief statement you may wish to make at this point. You are not compelled to, but if you wish to we are giving you that opportunity.

OPENING STATEMENT OF HON. FRANK H. MURKOWSKI, A U.S. SENATOR FROM ALASKA

Senator MURKOWSKI. First of all, I think it is most appropriate that you called this hearing. This is the second hearing on energy. As you know, Senator Bingaman and I have both introduced comprehensive bills, a portion of which covers incentives, which are under the jurisdiction of this committee.

I totally agree with the comments of my good friend from Louisiana. Not enough people in this country recognize where energy comes from. Somebody has to produce it. Somebody has to refine it. As a consequence, we have gone through this exercise previously. There is a chart over there, and it is a little far away, but it shows the effort made in the Energy committee in 1992. That was about near the end of Senator Johnson's reign as chairman.

If you look at the far left column, you will note that there were significant activities within the committee: we increased domestic production, we reduced U.S. dependence on imported oil, we tried to expedite infrastructure development, the theory being to try and encourage the government to work with industry to expedite the permitting. We had the development of alternative fuels. We promoted conservation and efficiency. We increased low-income heating oil assistance. All these things were very necessary.

The problem was, when we got to the floor of the U.S. Senate we did not get any of these provisions. What we got, was a left-hand turn at a red light, if you can convince the policeman today that that really happened, and we got low-flush toilets that you get to flush twice. [Laughter.]

Now, the rationale behind that was that there was not a crisis. Those of us who had some idea of what was happening knew that we were consuming more than we were producing. Eventually, you get caught in the supply and demand curve, and even Congress cannot address that.

Now, what is different this time? I know that Jeff has seen this time and time again, but things are different. Do we have the other chart that shows that things are different? Well, then you have to take my word for it, and I will give it to you. [Laughter.]

The reason things are different now, is we have come to the reality that, in the last decade, we really have not done much on the supply side. We have not built a new coal-fired plant in this country since 1995. We have not done anything on nuclear for almost 25 years. We cannot address what to do with the waste that comes from nuclear power which generates 22 percent of our energy. The industry is basically choking on its own waste.

We have seen oil imports go from, somewhere in the area of 37 percent in 1973 when we had the public outrage, we had lines around the block. We created the Strategic Petroleum Reserve. We did something positive.

Now we are 57 percent dependent on imported oil. The Department of Energy says it is going to go up to 63 or 64 percent. That is why it is different this time.

If you go into natural gas, we saw natural gas move from $2 to over $10. It is currently down, but the reality is we are using our reserves faster than we are finding new reserves and replacing them.

Then we suddenly find ourselves with the problem of infrastructure. We do not have the transmission capability in either gas or electric to meet the increased demand. That is why things are different this time.

We must address this crisis in a positive manner with comprehensive legislation. I intend to work with Senator Bingaman in that regard in hopes that we can get a chairman's mark that will

be suitable in an expedited process that covers both the jurisdiction of the Energy and Natural Resources Committee and this committee.

So, I would urge you, Mr. Chairman, to address the recommendations that you have before you and schedule a mark-up specifically on these so that we can move on them. If we do not, I think the public is going to hold us responsible.

The fear of the American people associated with black-outs, with children at home, it is just a reality out there that suggests that immediate action be taken.

As we look at our National security interests, and as Senator Breaux mentioned, our vulnerability to foreign imports, the realization that a lot of people assume energy is infinite.

Energy is specific because we move the world on oil. Unfortunately, we do not have another alternative. We can generate electric energy from gas, coal, nuclear, hydro, but you do not move America.

As we look at our increased dependence on imports from overseas, we recognize our increased vulnerability. I respect each member's own determination of what is good for his or her State, but we have got a situation here in this country where it is, not in my backyard, the NIMBY theory.

Well, you are going to have to get it from somewhere. As you increase your dependence on imports, the vulnerability associated with the leverage that countries have is very real.

It is beyond my comprehension that the American people would support a continuation of imports from Iraq at a time when we are enforcing a no fly zone over Iraq, where we are putting American men and women in harm's way each day as they enforce it. Saddam Hussein is trying to shoot us down, yet we are hell-bent to import 750,000 barrels a day.

If there is any doubt as to the effectiveness of the OPEC cartel, you will remember a few weeks ago when Saddam Hussein cut his production and cut the sale of 2.5 million barrels a day. We thought OPEC was going to make up the difference. They did not. They simply sat by and said, we are going to wait another month and make a determination. Now Saddam Hussein is back on target.

So, we need to move and we need to move with dispatch, Mr. Chairman. I am going to enter into the record the specific recommendations with regard to tax incentives that are a part of the legislation that we have submitted to the committee collectively.

[The recommendations appear in the appendix.]

Senator MURKOWSKI. The bottom line here is, we want to reduce U.S. dependence on foreign oil. We want to expedite the construction of infrastructure. We want to develop alternatives and renewables, including our refining capacity.

We have not built a new refinery in 25 years, but we have to increase domestic production and that is all there is to it. We have the technology. We can do it safely, and we have got to get on with it. This covers the hybrid of vehicles, it covers allowing people to use HOV lanes for fuel-efficient automobiles. It is going to need some paring down, but, nevertheless, there is enough meat here, Mr. Chairman, to start the process. I would encourage that you move on it with dispatch.

Thank you.

The CHAIRMAN. Thank you very much, Senator. It is clear we are going to have an energy bill passed in the Senate. I know that you and Senator Bingaman are both working very hard.

It is equally clear that tax provisions are going to be a part of it. You have my assurance that this committee is going to move expeditiously on this issue.

Senator Graham?

OPENING STATEMENT OF HON. BOB GRAHAM, A U.S. SENATOR FROM FLORIDA

Senator GRAHAM. Thank you, Mr. Chairman. I would also express my appreciation for your holding this hearing. I would like to just comment on four concepts which I think help frame the context for this discussion.

One, is the issue of diversity. We are, in my judgment, becoming increasingly dependent on a narrower band of fuel sources in the United States to our long- term disadvantage. One of the things that I believe will be the result of this discussion today is opening our minds to a broader array of means of meeting our energy needs.

Second, is this issue of domestic/foreign balance. I believe that has to be discussed in the context of an energy policy for when. If we are talking about an energy policy for the next 25 years, we will take an entirely different approach to that issue of international versus domestic supply than if we are talking about an energy policy for the next 250 years.

I believe we ought to take the long-term view because I do not want to leave to my grandchildren or great- grandchildren an America which has drained itself of its domestic energy capabilities. I believe that there are policies that we might be tempted to adopt today that would have that result.

A third issue, is balance. Energy policy is a critical national issue. Economic development and protecting sensitive environments are also critical national issues.

We cannot look at any one of those in isolation from the others. We must try to have public policies which allow us to take all of those into account and give them appropriate balance.

At some point, we are going to be talking about issues of outer-continental shelf drilling, and I am going to express the feeling that I think that we have over-balanced the methods of determining the appropriateness of that option, and that the result of that over-balance is maybe the reaction that we got last week relative to Site 181.

Finally, we must be realistic. The reality is that, when we started this Congress, the Congressional Budget Office was estimating that over the next 5 years we would have a surplus of $283 billion.

Since the beginning of the year, several adjustments have occurred to that. One, has been a political adjustment. Both parties have agreed that not only Social Security, but also the Medicare trust fund should be protected, placed into a lock box or some other form of accounting protection.

Since that time, the Congressional Budget Office has revised its estimate of what the economy will generate over the next 5 years in terms of the surplus.

We have also passed a tax bill which has directed a portion of that surplus to tax relief. The result of all of those decisions is that, instead of having an estimated surplus for the next 5 years of $283 billion, we now have an estimated surplus of $28 billion.

So 90 percent of the estimated surplus from just six months ago has evaporated. That is going to put tremendous pressure on proposals for new spending or reducing revenue.

I think, therefore, that as we look at ideas for increasing our energy supply through tax incentives and the reduced revenues that those would entail, that we need to be realistic about the need to find offsets for those tax reductions.

The challenge is going to be seeing where in our current spending or revenue programs there are soft spots that can be eliminated in order to divert funds to pay for the cost of the suggested tax incentives for energy, or for any of the other spending or tax proposals that might be made as part of an energy policy.

Mr. Chairman, I think those are some important contextual issues.

The CHAIRMAN. Thank you very much. Thank you, Senator.

Senator Bingaman?

Senator BINGAMAN. Mr. Chairman, I will just wait and hear from the witnesses. Thank you.

The CHAIRMAN. Thank you very much.

Senator, do you want to introduce the first witness, Dr. Hakes?

Senator GRAHAM. Thank you, Mr. Chairman.

I am very pleased with the panel that we have today to help educate us on these issues. I would like to particularly thank you for inviting, and I appreciate the opportunity to introduce, my good friend, Dr. Jay Hakes. Dr. Hakes served for several years in our administration in Tallahassee, including serving as the director of the State of Florida's Energy Office.

Dr. Hakes is currently serving as director of the Jimmy Carter Presidential Library in Atlanta, Georgia. Prior to that, he served as the administrator of the Energy Information Administration within the Department of Energy from 1993 to 2000.

In his role as the administrator of the Energy Information Administration, he oversaw the transition into the Information Age with the development of such things as the EIA's award-winning Web site.

He also oversaw the publication of major studies on a variety of topics ranging from long-term oil reserves to the cost of limiting greenhouse gas emissions.

During the course of that service, he testified over 25 times to committees of the Congress on various energy issues, and I am glad he is continuing that tradition today.

The CHAIRMAN. Thank you very much, Senator.

I think what I would like to do, is introduce all the witnesses. Then we can go back and begin with you, Dr. Hakes.

After Dr. Hakes, we will go to Mr. Hall, from the Independent Petroleum Association of America. Mr. Hall will address the tax issues facing the domestic oil and gas industry. In particular, he

will talk about the role of tax incentives confronting the cyclical nature of the oil and gas industry.

Our next witness will be Ronald Williams. Mr. Williams is the president of Gary-Williams Energy Corporation. As many of us have heard over the past months, refinery capacity is one of the major issues, as we are still basic producers and consumers of gasoline.

Smaller refineries, like the one in my home State of Montana, play an important role in keeping the supply of gas to our homes, to our cars, to our Nation. Mr. Williams will talk about the utility of a credit for small refineries to address the cost of compliance with new EPA standards.

Next, is Daniel Kammen. Professor Kammen is the director of the Renewable and Appropriate Energy Laboratory at the University of California at Berkeley. Professor Kammen will consider tax incentives in the context of overall energy policy.

Specifically, his testimony will cover proposals relating to alternative energy supply, conservation, and the utility of tax incentives in fostering these technologies.

Last, we have Virinder Singh. Mr. Singh is the research director of the Renewable Energy Policy Project. He will testify on renewable energy technologies and markets.

So, Dr. Hakes, why do we not begin with you? As you probably know, we have a five-minute rule here. All of your statements will be included in the record.

STATEMENT OF HON. JAY E. HAKES, FORMER ADMINISTRATOR, ENERGY INFORMATION ADMINISTRATION, ATLANTA, GEORGIA

Dr. HAKES. I would certainly like to thank the leadership of the committee for this opportunity to testify. It is good to be back with the leadership of the Energy Committee, for whom many of these studies were done originally, and also to be with Senator Graham, who I think it was just about 20 years ago appointed me as the Florida energy director.

I think the reason we are here today is because we have had some very serious problems recently in energy markets. Despite this, I think, in general, our energy policy has worked well. I mean, certainly people can go and purchase energy at reasonable prices.

But I think the critics are right in pointing to three areas where current policy seems to be particularly deficient. One, is our reliance on foreign imports of oil, which is continuing to grow.

Second, we do not have in place an effective program to stop the growth of greenhouse gas emissions, most of which result from energy activities.

Third, we seem unable to stop wild swings in energy prices. It is these wild swings, I think, more than anything else that has brought us together today for this discussion.

I think there are reasons to believe that these swings may be even worse in the future than they have been in the past. I get a little bit concerned sometimes when the academic economists seem unconcerned about these wild price swings, and I think that is true of economists in both parties.

As I discuss in my testimony, we can find some good example of tax incentives that have had a strong and positive impact on U.S. energy policy. The classic example, is the boost to the production of coal bed methane provided by the alternative fuel production credit.

With the assistance of this credit, production of coal bed methane grew steadily during the 1990s, to supply about 7 percent of total U.S. dry gas production in 1999.

Another success of this program was the ability of this industry to maintain its strength after the credit reached its scheduled termination date. I think the combination of these factors almost makes this tax incentive unique in terms of its ability to be successful.

But I have listed in my written testimony about seven or eight criteria that I think could be used to evaluate different proposals that come forward. Rather than try to discuss all of them, let me just discuss one of them, which would be the duration of the tax incentive.

I think that, in general, many recent proposals in the field of energy are rather weak compared to those that were proposed, say, in the 1970s. One of the signs of this, is that the proposals tend to be for short periods of time.

In many cases, an advanced technology will be given a 5-year window in which a tax boost will be there. Sometimes the advocates for these technologies will say, "Well, 5 years is enough. This technology is right on the verge of being successful."

Or maybe they are just trying to be pragmatic and say, under scoring rules, we are not going to be able to get more than 5 years, so we will get what we can get and maybe try to extend it down the road.

But my feeling is that these advanced technologies actually take a longer period of nurture and care to be successful, and that duration is extremely important in creating an investment climate for a new technology.

So I think the duration question is an important one, and that off-and-on-again credits tend to create sort of a boom and bust cycle in energy, which is one of the problems we are trying to get away from, I think.

I would commend Mr. Singh's testimony on this issue, because I think some of the examples he gives from Texas make this point in a very specific and helpful way.

Energy is a big part of our National economy. As a result, it would be very expensive to bring about major changes in the patterns of energy production and use through tax incentives.

In other words, if we want to solve the oil import problem, we want to solve the greenhouse gas problem, or we want to deal with price volatility, it would not be an inexpensive endeavor.

Just to provide a little bit of information on this, an EIA study showed that, in 1999, we were spending about $3 billion a year on tax expenditures for energy. Now, $3 billion is a considerable amount of money, at least in my calculations. But that is less than half of one percent of energy expenditures for that year.

So I think the question that has to be raised, is how much can be spent, and is that affordable? In this big engine of energy, which

is such a big part of our economy, are we able to really move that engine with a little bit of nibbling here and there?

Some might ask, "Well, what is the harm in passing tax incentives that may not do much? After all, we might get some positive results that are better than expected, or if we do not get results, at least the tax expenditures will end up being relatively small."

I think these are all good points, but I think the danger is looking at tax incentives apart from other policy levers that might actually produce more predictable and extensive results. I would put on the table here things like the renewable portfolio standard, CAFE standards, appliance standards, the Strategic Petroleum Reserve.

One final note. Most of the energy strategies being proposed have relatively little to do with the problem of price volatility. At some point I think we need to look at a set of counter-cyclical policies that might deal more directly with this issue.

Thank you, Mr. Chairman.

The CHAIRMAN. Well, thank you very much, Dr. Hakes.

[The prepared statement of Dr. Hakes appears in the appendix.]

The CHAIRMAN. Next, Mr. Hall.

STATEMENT OF DAVID S. HALL, ON BEHALF OF THE INDEPENDENT PETROLEUM ASSOCIATION OF AMERICA, TAFT, CALIFORNIA

Mr. HALL. Thank you. Mr. Chairman and members of the committee, I am David Hall, Manager of Taxation for Berry Petroleum Company of Taft, California, and a member of the Taxation Committee of the Independent Petroleum Association of America (IPAA).

Today's hearing examines the role of tax incentives in energy policy. To put this issue in perspective, we can turn to the National Petroleum Council's 1999 Natural Gas Study. This study concluded that the U.S. demand for natural gas would increase by over 30 percent over the next 10 years.

In 1994, the National Petroleum Council conducted a study on marginal wells, and concluded that Federal tax incentives were needed to encourage operation of marginal wells.

The Federal Government and the tax code play a significant, if not pivotal, factor in two areas: (1) access to capital and (2) access to resource base.

Federal tax policy has historically played a substantial role in developing America's oil and natural gas. But the converse is equally true, such as the Windfall Profits Tax and the Alternative Minimum Tax that have sucked millions of dollars from the exploration and production of oil and natural gas. These changes have discouraged capital from flowing towards this industry, and without capital the ultimate result is lower production.

Independent producers are now recovering from the low oil prices of 1998 and 1999 that starved the industry of needed funds to maintain existing production and to generate new production. A Marginal Well Tax Credit could have an impact on the industry during this same period.

In the near-term, there are a number of actions that can be taken to increase domestic production. In fact, there has been a wide agreement on these issues between both Republicans and

Democrats, alike. These items include: (1) allowing of G&G costs and expensing of delayed rental payments, (2) creation of the counter-cyclical Marginal Well Tax Credit, (3) suspension or elimination of net income limitation on percentage depletion for marginal wells, and the 65 percent net overall taxable income limit on percentage depletion, and (4) providing for an extended period for net operating loss carry-backs.

Equally important, these changes must be crafted in such a manner to ensure that AMT does not nullify the benefits that they would create. The mistake of 1986 should not be repeated.

For the future, the country needs to look towards tax policies and encourage domestic production. The AMT remains a constriction which should be addressed. Some of the future focuses need to be directed towards getting more out of existing resources, for example, updating the Enhanced Oil Tax Recovery Credit for new technologies that have been developed in the last 20 years.

Equally significant, policies need to address encouraging more new development. For example, the Section 29 credit for unconventional fuels proved to be a strong inducement in developing new resources, such as tar sands in California.

The question facing our nation is how to marshal the needed capital to develop our domestic resources? The 1999 Natural Gas Study estimates that an additional $10 billion will be needed to be invested annually in domestic production over the next 15 years to meet the expected demand. One source is the capital market, but it has yet to show a strong interest in the E&P industry, despite the recent high prices of both commodities. The capital markets are likely to focus their attention on large companies. So while some large independents may derive some of their capital from these markets, other independents will need to look elsewhere. There is also no guarantee that such capital will go to domestic production.

The next source of capital will be from revenues generated from higher production and higher prices. First, the magnitude of this capital may be somewhat overstated because, just as prices for oil and natural gas have increased, prices for drilling rigs and other costs are also increasingly squeezing the capital that is available. Second, the capital will also need to be directed to the most promising projects, so there is no guarantee that it will be invested domestically. Third, the revenue will be reduced significantly by income taxes.

The challenge, then, is to create a mechanism to direct capital towards domestic production. One such approach would be to create a "plowback" incentive that would apply to expenditures for domestic oil and natural gas. This type of proposal would encourage capital formation and the development of domestic wells provided it was immediately beneficial. It would also address the compelling need to improve natural gas supplies, as well as reduce the growing dependency on foreign oil. It must apply to both oil and natural gas because they are inherently intertwined and often found together. A healthy domestic natural gas industry cannot exist with a healthy comparable oil industry. IPAA has been evaluating two approaches. The first, would be a deduction against the gross income of wells drilled domestically. The second, would be an investment tax credit applied to domestic investment. One of these meth-

ods could provide a substantial inflow of capital for domestic production.

In conclusion, if Congress wants to see more domestic oil and natural gas production it must recognize that the Federal tax policies play a critical role in whether capital will flow towards this industry and the production of these resources. There are immediate actions that can, and should, be taken. The time is right, as the nation is now seeking a more stable energy supply, and Congress should act now.

Thank you very much, Mr. Chairman.

The CHAIRMAN. Thank you, Mr. Hall.

[The prepared statement of Mr. Hall appears in the appendix.]

The CHAIRMAN. Mr. Williams?

STATEMENT OF RONALD W. WILLIAMS, PRESIDENT, GARY-WILLIAMS ENERGY CORPORATION, DENVER, CO

Mr. WILLIAMS. Thank you. My name is Ron Williams. I am the CEO of Gary-Williams Energy Corporation, a Denver-based oil refining company. Our primary asset is a 50,000 barrel-per-day refinery in Wynnewood, Oklahoma. We have 275 employees and fall within the EPA's small business refiner definition.

I speak today on behalf of an ad hoc coalition of 18 small refiners which produce diesel fuel. Together, we provide about 4 percent of the Nation's diesel.

The EPA's new diesel regulations created astringent sulfur standard of 15 parts per million for on-road diesel, beginning in June, 2006, a 97 percent reduction from the current 500 parts per million standard.

We are not here to quarrel with the EPA's clean air objectives. We worked closely with the agency on this diesel sulfur rule, but the EPA was unable to find ways to reduce the disproportionate economic burdens on small refiners and they encouraged us to address this issue with Congress.

In the absence of the tax assistance we are requesting today, our alternatives will be either to dramatically cut back or cease production of on-road diesel, or to go out of business altogether.

Existing U.S. refineries are operating at full sustainable capacity. No new refinery has been built for almost 25 years. Historic profit levels, new environmental regulations, and permitting requirements do not support the enormous cost of building new facilities. The new regulations will reduce the on-road diesel production.

A recent independent study projects a nationwide average shortfall of more than 12 percent. If diesel production from small business refiners is reduced or eliminated, supply shortages will become even more acute. Small business refiners have long served to maintain competition.

The Society of Independent Petroleum Marketers agrees. SIGMA, whose members supply 28,000 retail outlets and employ 270,000 people, has told us that small refiners give them an important pricing and supply advantage in their dealings with the major oil companies.

Small business refiners also supply about 20 percent of the U.S. military jet fuel. The impact of these regulations on small business refiners will be substantial and disproportionate, as the EPA ac-

knowledged. However, they were not able to offer small refiners any assistance.

The distribution will not allow a phase-in, because we cannot have multiple grades of diesel fuel in the marketplace. In our case, we expect that the diesel sulfur capital costs for this project to be over $45 million, about twice what we paid for the refinery.

In addition, our operating costs will increase $6–7 million per year. To comply also with Tier II gasoline desulferization regulations, our capital costs can total almost $80 million. Without assistance, it is unlikely that those in this ad hoc coalition can make these investments.

The coalition proposes an approach to meet our investment needs which combine a provision to expense 75 percent of the capital costs for these projects with an environmental tax credit which is a production credit of five cents for each gallon of ultra- and low-sulfur diesel fuel produced. This earned credit would be capped at 25 percent of the qualified capital costs.

It is important to note that small refiners do not have many of the benefits enjoyed by the major diversified, integrated oil companies, such as access to capital and proprietary crude supplies.

We believe that the 75/25 approach would level the playing field by reducing a small refiner's capital expenditures by approximately 25 percent. We are aware that some members of this committee are hesitant to endorse tax credits as a matter of principle. We understand and appreciate that position.

All we can say, is after extensive exploration of alternatives, we have not found any other approach that would allow us to comply with these diesel sulfur regulations.

We seek this tax incentive to meet the government mandate set forth by the EPA and to preserve small, but essential, players in a critical segment of the economy. Let me emphasize that this tax credit is an earned credit. Small business refiners will realize no benefits unless we produce compliant fuel.

Thank you.

The CHAIRMAN. Thank you, Mr. Williams.

[The prepared statement of Mr. Williams appears in the appendix.]

The CHAIRMAN. Professor Kammen?

STATEMENT OF DANIEL M. KAMMEN, DIRECTOR, RENEWABLE AND APPROPRIATE ENERGY LABORATORY, ENERGY AND RESOURCES GROUP, BERKELEY, CALIFORNIA

Professor KAMMEN. Thank you for the opportunity to speak today. I am Daniel Kammen. I am professor of Energy in Society at the University of California, Berkeley. I am also director of the Renewable and Appropriate Energy Laboratory, and a professor of Nuclear Engineering.

Today we are at a critical juncture where a number of renewable energy options are becoming economic and could be economic in the near future. We have the opportunity to build those markets and to build energy diversity, a critical resource for America's future.

I have got three simple messages which I think encapsulate these features from my testimony today. One, is that the U.S. has been on a research and development roller coaster for new tech-

nologies for a number of years. The programs and funds for renewables and energy efficiency have gone up and down frequently, and those have generated a number of inefficiencies in the process.

Currently, the energy industry in the United States reinvests less than a half a percent of its revenues into R&D, compared to numbers over 12 percent for some of the more energetic sectors, like biotechnology. That does not make sense, given how critical energy is for our future.

We have opportunities to make the research and development programs longer term, more sustainable, and to provide better access to markets for emerging technologies like wind, like biomass, like fuel cells. That is a critical feature of what we can produce in the long run.

Renewable energy and energy efficiency have been critical to our economy, despite the fact that many people still perceive them to be bit players. The changes in the U.S. economy in terms of energy efficiency has, in fact, been the largest single change in the energy economy over the last 25 years.

If we had not seen the roughly 30 percent increase in efficiency in U.S. GDP production based on energy use, we would see our National energy bill, which totals over $600 billion this year, being over $900 billion.

So, energy efficiency has been a critical piece of the picture, and renewables have the opportunity, if we support them, to also build that sort of critical diversity in the U.S. energy supply to reduce our dependence on foreign oil, et cetera.

The next critical piece of the picture is that we need to couple measures that build energy development with measures that increase the market for renewables, and to level the playing field so that renewables can compete on an even basis.

The Production Tax Credit is an example of that, but there are a number of others. Dr. Hakes mentioned a couple of the critical ones early on, and I would like to highlight a few of the absolutely central features that we could do.

Energy efficiency standards that set clear targets for medium- and long-term changes in the energy mix are critical. Past programs like the Green Lights program, Energy Star, have been ones where there have been a dramatic and sustained change in the U.S. economy at remarkably low costs, in fact, in many cases, negative cost.

Another critical feature, would be tax incentives for clean vehicles, hybrid vehicles, fuel cell powered vehicles, to transition the U.S. fleet from a highly inefficient fleet right now to a much more efficient fleet overall, dramatically reducing our dependence on foreign oil.

A critical feature of that would be to include analysis and an increase of the CAFE standards, and particularly to close the SUV loophole so that we can see a far more efficient vehicle fleet overall.

A third critical feature in building sustainable markets for new energy technologies is the renewables portfolio standard, which makes a great deal of sense in a variety of means.

The renewables portfolio standard would call for a fraction of energy to come from renewable sources, and critically to use the market to help select those.

With a renewable standard like Texas has instituted and has seen a dramatic increase in the amount of renewables in Texas based on that, and has done that far ahead of anticipated schedule, once clear standards for the amount of renewable energy in the mix and longer term were set forward.

A further feature of this process, is to look not, in fact, at the costs for these programs, but for the benefits. It turns out that an increasing number of studies are now indicating that, in fact, we could significantly reduce dependence on foreign oil and gas and build diversity in the U.S. market at an economic profit, not at a cost.

One study which, for example, uses the Kyoto target to reduce greenhouse gas emissions concludes the following. This is a study which has now been widely accepted and is based on U.S. EPA and DOE analysis, and from independent groups, and university groups such as my own.

In this study, to reduce our emissions of greenhouse gases and to reduce our dependence on foreign oil, the costs of a program to achieve that modest standard would be roughly $30 billion a year.

The benefits, however, would account for roughly a $45 billion savings in energy use, as we saw with efficiency in the last 25 years, a $45 billion per year benefit to the economy.

Then there would be a secondary effect, where the reduction in our bill for energy causes additional economic benefits of roughly $40 billion more, and then roughly a $5 billion additional benefit due to meeting reduced environmental damage standards.

That takes a program that many people are touting as a cost to the U.S. economy to one that could potentially be an economic benefit on the order of $50-60 billion a year. That is good economic policy and tremendously good environmental policy.

I would like to conclude with that statement, but I look forward to the chance to work with the committee to hopefully enact some of these options. Thank you very much.

The CHAIRMAN. Well, thank you very much, Professor, for that provocative statement. I appreciate it.

[The prepared statement of Professor Kammen appears in the appendix.]

The CHAIRMAN. Mr. Singh?

STATEMENT OF VIRINDER SINGH, RESEARCH DIRECTOR, RENEWABLE ENERGY POLICY PROJECT, WASHINGTON, DC

Mr. SINGH. Thank you, Chairman Baucus and members of the committee. Thank you for inviting me to today's hearing.

The Renewable Energy Policy Project is a nonprofit devoted to educating both the public and key decision makers about renewable energy policies, market trends, and technologies.

Today, I would like to make a number of points—I am being a bit ambitious here—regarding renewable energy, and specifically a Production Tax Credit. I will go through these points in detail, now.

First, renewable energy is important to the United States. I do not have too much time to go through all these values, but, in light of Senator Graham's comments, I would really like to emphasize this key point.

Renewable energy, fuel-free renewables such as wheat, solar, and geothermal, appear to act very much like Treasury bills and personal, individual Americans' investment portfolios, in this sense: it might cost a bit more than stocks, for example. However, their volatility is much less.

They play a very important role in insulating American consumers from the wild price patterns we have seen in natural gas, and in fluctuations in, for example, hydroelectric capacity.

Moving beyond that, the second point is that Production Tax Credit, specifically, is very important for renewable energy. The Production Tax Credit, which currently offers 1.5 cents per kilowatt hour, or adjusted for inflation 1.7 cents per kilowatt hour, to wind, closed-loop biomass facilities, and power plants fed by poultry litter, has played an important role in renewable energy development, particularly by supporting the development of wind power.

I would like to mention, briefly, the example of Texas. Texas passed the renewable portfolio standard which required its utilities to put in 2,000 megawatts of new renewable energy facilities by 2009. In response, over half of the 2,000 megawatt total will be fulfilled by the end of 2001, 8 years before the deadline for compliance.

Now, the renewable portfolio standard is the main reason wind is now prevalent in Texas, but the Production Tax Credit was essential in influencing the timing of the $1 billion worth invested in wind power in Texas over a 2.5-year period.

What that means, is that the PTC was very important to the world of private capital, which in turn is essential for continued renewable energy development. But, as my next recommendation states, the potentially short-lived wind boom in Texas is not necessarily the best path for the orderly development of the renewable energy in this region.

So my third observation, is that the Production Tax Credit should be extended. A significant lesson for the history of renewable energy development is that sharp, policy-driven spikes in investment and business activity are not necessarily good for the industry. Ephemeral tax credits do not lead to the earnest expansion of capital in overall industry capability.

Again, the current state of wind power development provides the best example. Not only in Texas, but also in the Pacific Northwest and in the Midwest, we are seeing a tremendous surge of wind power coming on-line.

But what we are also seeing, is that firms that put in the wind turbines are not able to add to their actual capacity of their operations because they fear that, once 2001 ends and therefore the Production Tax Credit ends, they might have to face different economics and they are worried about essentially laying off people and losing that capacity that they built up over the last couple of years.

So what is happening, is that even though we are seeing a surge in wind power development, we are actually seeing wind power firms having to turn down certain jobs because they do not have the capacity to do them.

They are actually rejecting offers to do some projects because they are afraid about adding too much to their company, and then seeing the Production Tax Credit end, and then seeing no business,

or very little business, coming on-line afterwards. That is an unfortunate thing to see, because the PTC can do a lot to really add to industry capability.

Next, we see that, ideally, the Production Tax Credit should be made permanent. I want to give a little bit of context for that. Based upon REP's interactions with the utility industry, and given the volatility in the U.S. electricity market today, in particular in the west, I expect that many renewable energy projects will progress very slowly, for two reasons, and probably not surprising reasons.

First, investors are awaiting the results of overlapping energy policy deliberations at the State and Federal level. Second, project developers must seek—in the case of big central station plants—permission to site their plants and they need access to scarce transmission lines.

Now, these two things are not unique to renewables. They are also common to fossil fuel projects. What that means, is that we will not see rapid renewable energy development over the next 2 years, even if you do have a Production Tax Credit in line.

Instead, I have heard from the wind industry, it will take 5 years; from the geothermal industry, similar periods of time. Therefore, the extension of the tax credit should take into account the real time it takes to put in an ambitious renewable energy project.

My fifth observation, is that the Production Tax Credit should be expanded to other renewables. While we are seeing a surge in wind power development right now, we have seen, historically, tremendous price improvements in all the key renewable energy technologies, including geothermal, wind, solar, and biomass.

Again, just to step back, I am not talking about hydroelectric. We do not typically work on hydroelectric issues and we certainly do not want to preclude that from the overall considerations, but this is what we specialize in.

Geothermal, wind, solar, and biomass have exceeded all published price expectations over the last 25 years. According to a study by five Federal labs, we shall see significant potential for all these technologies in a whole variety of scenarios over the next 20 years. So, therefore, all technologies have tremendous possibility to grow.

Just as important as the overall possibility to grow, different regions have different renewable energy capabilities. A study we are looking at in the South that we are pursuing finds that biomass is by far the biggest renewable energy resource in the South, geothermal energy potential is great in the west, wind power is at its best throughout the middle of the United States. Making all these technologies eligible for the PTC means that States throughout the United States can benefit.

Extension should also consider expanding the definition of biomass to move from energy crops to other biomass, such as urban wood waste, agricultural residues, forest residues, which are all, in fact, in many cases, cheaper than energy crops and can really benefit from the Production Tax Credit.

My sixth point, is that support for public power is vital. I had the pleasure of——

The CHAIRMAN. Mr. Singh, I do not know how many points you have. I am going to have to ask you to begin to wrap up.

Mr. SINGH. All right.

Support for public power is vital. A lot of public power agencies are doing a lot in renewable energy, and we should not exclude them. Finally, as has been mentioned before, other policies are essential to advance renewables.

Thank you for allowing me to go a little bit over.

The CHAIRMAN. Thank you. No problem. Thank you very much.

[The prepared statement of Mr. Singh appears in the appendix.]

The CHAIRMAN. I guess the fundamental question I have, is to what degree, and where, and how long, do tax credits, deductions, and tax expenditures work? Dr. Hakes, you pointed out that, what, less than half a percent of the cost of producing energy—I do not know what terms you used—is tax expenditures. Something along those lines.

Dr. HAKES. Expenditures for energy. It would only be half a percent.

The CHAIRMAN. That is not a lot. It is on the margin. It is something, but it is not a lot. I think, essentially, most people would agree that the basic problem we have is the price set by OPEC, and how OPEC kind of plays us like a violin.

When OPEC's prices when up there were capital expenditures, then when it went down again, it makes it difficult. So, there is some volatility caused by OPEC, as well as some volatility caused by the duration of these tax expenditures.

But some of you have testified very eloquently and powerfully about the need for some tax credits, extending the production tax credit, for example. Some have sort of suggested that maybe, on the margin, they have worked a little on these tax expenditures. But it is really, if we are honest with ourselves, only on the margin.

So my basic question, and I would like to get, if we can, some agreement here, is whether, how much, and where do credits, deductions, exclusions, et cetera make a difference if we are going to meet some of our energy needs?

Do you want to start, Dr. Hakes?

Dr. HAKES. It seems to me that where the incentives can play the biggest role is where they are leveraging other policies. For instance, if you were to increase the standards for automobile efficiency and SUV efficiency, that obviously would be something that the industry would have to work on, consumers would have to work on.

One of the things that might be done, would be to offer a tax credit for hybrid cars and fuel cell cars, which I think are more difficult, as a way of helping them meet that tougher standard.

That way you avoid the problem of giving an incentive to build a very efficient car that just allows a less efficient car to be built into the overall average, and so you really have not achieved much of your National goal.

So it seems to me that if these tax incentives could be leveraged with other policies or very carefully targeted towards what the real problems are. If volatility is a problem, it seems to me that having a cap on a small refiner based on a daily average, does not make a lot of sense.

So there might be places where you can find you are leveraging another policy or you are really dealing with this problem of volatility, where you might get a fairly big bang for your buck.

But if you are going to solve the import problem, or you are going to solve the greenhouse gas problem, or eliminate price volatility, those are very expensive things to do, in my judgment.

The CHAIRMAN. Mr. Hall?

Mr. HALL. Thank you. I think tax credits help out a lot in allowing the producer to continue operation. Most of the cash-flows from your small, independent producers come from the cash-flow of the prices they receive for their oil, so it (credit) allows them to reinvest that money and continue the operations.

I talked to one of the producers the other day that produces tar sands, and they receive Section 29 credit. They have to steam the tar sand, so the cost is very high. It is very operational-intense. There are a lot of cost factors involved in extracting the oil.

Without the credits, they would not be able to continue to produce oil from tar sands. Our oil is 13-degree viscosity, which is like maple syrup. Theirs is eight degrees, which means it is truly a tar sand. So, without credits, they would not be able to operate at all. In most cases, credits are very beneficial to producers allowing them to continue their operations.

But in some cases, the problem we have with credits is Alternative Minimum Tax. We can have a credit, but you cannot necessarily monetize it back and put it back (convert it to cash) into production for drilling again. If you have Alternative Minimum Tax, it prevents you from utilizing the credit.

The CHAIRMAN. Thank you. I have not got a lot of time here.

Mr. HALL. Thank you.

The CHAIRMAN. Mr. Williams?

Mr. WILLIAMS. Thank you, Senator.

As to the refining industry, with their increased environmental regulations over the years, which most of us really do not have any problem with, we think they have all been good in public, we have really seen a major reduction in capacity in the industry.

I think over the last 15 years we have lost about a million barrels of refining capacity. In the last 2 years, we have seen periods where we have genuinely not been able to supply our Nation's needs.

With the added investment that the industry as a whole is going to have to spend, about $8–9 billion for the majors and the small refiners, the small refiners alone are looking at about $300 million.

The CHAIRMAN. So you do not quarrel with the air and environmental standards, per say. You are just trying to find some way to deal with them so that you can stay alive and produce.

Mr. WILLIAMS. Well, I would have to be honest and say we quarreled for a while when they were promulgating the regulations, but we found that we could not accomplish anything.

The CHAIRMAN. But you are not advocating that we repeal those.

Mr. WILLIAMS. No. Absolutely not.

The CHAIRMAN. Or that the Congress roll them back.

Mr. WILLIAMS. No. Absolutely not. No. We think we just need to find a way to deal with them.

The CHAIRMAN. I am sorry. I have got to go overboard just a little bit here.

Professor Kammen?

Professor KAMMEN. Sure. I would argue that the tax credits are, in fact, critical for new technologies, to build new markets. So we see, for example, the Production Tax Credit for wind has contributed to a dramatic increase in capacity. In fact, wind is now increasing by around 25 percent new capacity each year. That is a dramatic increase. We have seen similar ramp- ups in other areas.

So the technologies that are at the margin, not quite economic but close to it, are, in fact, the areas where those funds are leveraged the most. Renewables and energy efficiency typically are primarily up-front costs, with no fuel costs.

So, those credits initially to get things rolling, often coupled with sustained research and development programs, provide the best combination of technology push and market pull to build that energy diversity. So I think, actually, they are critical and that they make the most sense in areas where we see these emerging technologies.

The CHAIRMAN. All right.

Mr. Singh?

Mr. SINGH. The only thing I would add, is that it is interesting in the Pacific Northwest. Right now, we are seeing utilities such as Bonneville Power Administration and Pacificor actually trying to do wind power because it makes economic sense.

The Production Tax Credit adds just that sweetener so that wind power can actually be cheaper than natural gas at this point, and given some scenarios of natural gas prices in the future.

So, we are seeing the PTC play a very important role in affecting the economics of wind versus natural gas in the northwest, which is catalyzing wind development.

The CHAIRMAN. Well, both of you just said the magic words. In today's Wall Street Journal, maybe you saw it, this is a photograph of Earl Oldperson. He was the one- time chief of the Blackfeet Tribe and has been very active. Anyway, this is touting the benefits of wind power. They hope to produce about 66 megawatts in a couple of years.

It is kind of ironic, because they had a much larger reservationthey are up in the Rockies-but they were pushed back. Now there is a lot of wind. There always has been a lot of wind, but they are utilizing the wind now and it has helped to make this work. Bonneville is working on the agreement with them.

I intend to explore this a little bit further. We are going to have field hearings, and I hope at that time we can explore it further. Thank you very much.

Senator Grassley?

Senator GRASSLEY. Thank you, Mr. Chairman.

Mr. Singh, those of us from rural America are always interested in how we can have economic development in rural America, particularly because of the loss of population and the decline of farm income and the number of farmers.

You mentioned in your testimony that renewable energy projects offer substantial economic development, as well as new jobs. Do you have examples of those economic benefits? More importantly,

do you have estimates of the revenues that you think renewable projects could generate?

Mr. SINGH. Senator Grassley, renewables provide revenues for rural communities and landowners, and they provide jobs in a whole range of activities from manufacturing to the installation and construction of renewable projects.

One study that REP completed found that, if you did 10,000 megawatts of wind in the United States, that would generate about $8 billion in revenues. On a more micro scale, a wind turbine hosted by a rancher or a farmer can generate $2,000 a year in revenues for that farmer. It is a fantastic cash crop that is really a big driver for development throughout the Midwest, including Iowa.

Biomass is another example. You can grow biomass crops on marginal farmland and it can help provide revenues to farmers who are threatened with maybe having to close down their farms. So, we do see some fantastic synergies between renewables and revenue generation, and job creation.

Senator GRASSLEY. We have an example of biomass, the switchgrass project, in conjunction with Alliant Electricity in Southeastern Iowa, as well.

Let me follow up with a question that is a little bit different. Several of our witnesses today discussed the volatility of the U.S. electric market. Could you estimate the number of renewable energy projects that we would need to help the Nation stabilize the electricity market, and would extending the Production Tax Credit contribute to that stability?

Mr. SINGH. Well, again, based upon what we are seeing in the market in places like the Northwest, and given the qualities of fuel-free renewables to have tremendous price stability, I think the interaction between the Production Tax Credit and market trends and policy trends in renewables will mean that the PTC will contribute to greater price stability, especially given what we are seeing in natural gas markets and hydroelectric capacity today.

Senator GRASSLEY. You have had an opportunity, I think, to study the Sheraton Valley project that I just referred to as switchgrass. Would you discuss that co- firing and biomass as a part of a way of helping both farmers as well as the energy situation?

Mr. SINGH. Well, the Sheraton Valley project involves growing switchgrass on farmlands, and that is providing benefits, not only revenue benefits to the farmers, but, interestingly, soil benefits and environmental benefits. So, it is providing revenues and environmental benefits.

The great thing about co-firing, from what we see, is that it is very low capital cost. You are using existing an coal power plant and feeding biomass into that power plant. Usually between 5 and 10 percent of the heat input of that coal plant is biomass.

You are not building a whole new power plant to use the biomass, which means that co-firing is perhaps the cheapest biomass option we have in the country today.

There are a couple of technical issues that people are wrestling with. But, really, we have seen some great successes that have overcome those technical issues involving just different ways of

thinking about how to manage a coal plant. When those are done, you can see biomass taking off through co-firing.

Senator GRASSLEY. Yes. What about this extending to municipal utilities and cooperatives that we have so much of in the Midwest, and particularly in rural America through the rural electric cooperatives?

Mr. SINGH. Well, for example, the American Public Power Association has talked about the idea of a tradable tax credit, whereby public power entities can actually sell tax credits to entities that are taxed, and, therefore, get some of that revenue and capture some of that benefit so they can do renewable energy.

I think the importance of that is you are seeing a lot of public power agencies doing renewable energy: the Cosby Electric Association in Alaska doing wind power; in California, Sacramento and L.A. municipal districts are leading the charge of renewable energy development; even tribal entities, such as the Rosebud Sioux, doing wind power.

So, I think it is important to make sure that those entities are taken into consideration, because they are an important part of renewable energy development.

Senator GRASSLEY. Professor Kammen, taking off from where you were talking about leveling the playing field for renewables, how would you rank the Senate's choices, particularly through the Tax Code, or even if you would recommend other techniques for leveling the playing field?

Professor KAMMEN. There are a couple of features. I mean, it is certainly the case that with technologies, as I said, that are near economic or are right at the threshold now, like wind is, that the Production Tax Credit is a critical feature.

It is also critical, though, to marry that with opening up the markets. California has been an example where we have seen renewable facilities, the so-called qualified facilities, going on- and offline due to real instability and insecurity in the market.

So building a share of the market for these technologies to compete in has been a critical part of the picture. The renewables portfolio standard is one way to do that.

California, for example, has averted several days of blackouts already because of wind capacity that has been on-line, and the summer shortfall in California could be alleviated by bringing on wind capacity, which has already been seen by State and by private groups as economically viable. So, building those technologies into the market is one way to do what you are asking for, to marry these technologies in.

Senator GRASSLEY. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you very much, Senator.

Senator Bingaman?

Senator BINGAMAN. Thank you very much.

I appreciate all of the witnesses and the very good testimony.

Professor Kammen, let me ask you, first. I am concerned, and I think the Chairman mentioned this concern, too, that we not enact tax incentives that will essentially give people taxpayer funds to do what they would otherwise would have done at any rate.

Now, if wind is the most efficient and the lowest-cost power we can produce, why is it so incumbent upon us to continue with more

tax credits for wind, either investment tax credits to construct wind power facilities, or production tax credits?

Professor KAMMEN. That is a great question. Thank you for it.

There are a couple of features to that. One, is that wind is currently competitive because of the tax credit. It is not something that is in all areas-there are individual spots where it is highly competitive-overall to build enough of a market so that they can compete. We need the tax credit to continue at least long enough to get a couple of product generations into place.

Senator BINGAMAN. Let me just interrupt there. I want to avoid the circumstance that we got into with solar before, where we put in a tax credit to encourage use of a technology that, then when the tax credit went away, most of the activity went away.

Now, how do we ensure that we do not have an artificial prop which, as soon as we take away the tax credit, the thing goes away again?

Professor KAMMEN. The way to achieve that, is to provide clear signals as for duration of credits, but also, critically, to marry that with programs to build their market niche.

So the problems with the solar credits before, is this was done at a time when solar was not economic. There was no reasonable prospect for it to be near-term economically viable.

Right now, we are seeing that situation changing so that, given enough time for the market share to expand, for production costs to come down, they will then be competitive. So the feature that is useful here is to marry these programs with features that phase-out credits once technologies become competitive. For the first time in our history, we are at that point.

Senator BINGAMAN. You think wind energy will be competitive. For example, you say here that you support a 30 percent investment tax credit being proposed for small, 75-kilowatt or below, wind power systems.

Now, you believe that if we provide that 30 percent investment tax credit, that that then becomes competitive?

Professor KAMMEN. In fact, we are seeing exactly that. The cost for wind turbines have fallen dramatically. In fact, this learning curve process, where, roughly, each time you double the capacity of the production, we see about a 20 percent drop in the cost of that technology.

So wind is on what we are calling the steep part of this learning curve now, where costs are dramatically falling. Solar is also seeing it. Fuel cells are just beginning to see those drops. So, those are the technologies that you want to support, so that is why that tax credit makes great sense, to help build that energy diversity.

Senator BINGAMAN. I guess another question I have got from your testimony, is this Federal renewable portfolio standard. We have a concern, I guess, that the renewable portfolio standards that exist, or the one that was referred to by Mr. Singh in Texas, and other places, those are at the State level.

Now, how do you believe the Federal Government can most usefully accomplish something like a renewable portfolio standard? I mean, there is a lot of resistance to the Federal Government coming in and overlaying some mandate on States in this kind of an area.

Professor KAMMEN. Well, in fact, I believe there are two things that the Federal Government can do. One, is to enact an initially small renewable portfolio standard, and then consider how to ramp it up. So, for example, I propose initially a 2-percent standard that would then ramp up.

In fact, each time we have instituted these sorts of standards we have discovered that the cost of renewable energy, and critically the cost of energy efficiency, have been low-cost or negative cost.

A large range of programs have demonstrated that, for example, compact fluorescent lighting, a whole variety of things have shown that, once we get the ball rolling for these new technologies, their costs drop quickly and, in fact, we discover a variety of savings. That is why it makes sense to enact an RPS now, experiment with it, ramp it up, but it is critical to send that initial signal.

Senator BINGAMAN. Mr. Singh, did you have any thoughts on that same problem of what role the Federal Government can usefully play in this idea of a renewable portfolio standard, or to what extent should the States be encouraged, or things we can do that incentivize States, to do what Texas has done?

Mr. SINGH. It is a very tricky issue. There is a definite tension between State and Federal.

One of the biggest issues facing renewables, just like other power plants, is transmission issues. That really does get into thorny issue regarding, what can States do and what can the Federal Government do.

I am not an expert on what FIRC can do, but something that the Federal Government can do to encourage transmission and to ensure that renewables get fairly treated in transmission policy, I think, will be very important, apart from things like the renewable portfolio standard.

Those are real infrastructural-enabling efforts that would help all types of projects, with or without the RPS. But the RPS does seem to be very important, too.

Senator BINGAMAN. My time is up, Mr. Chairman.

The CHAIRMAN. Thank you very much, Senator.

Senator Graham?

Senator GRAHAM. Thank you, Mr. Chairman.

Dr. Hakes, in your opening statement you cited three specific problems. The third of those, was wild price swings. Could you elaborate on what you think are the causes of those wild price swings, and what might be some of the remedies?

Dr. HAKES. Well, I think the current high prices are the result of 1999's low prices, where a lot of people could not make enough money to cover their costs, so drilling stopped and OPEC got renewed discipline, so production did not keep up with demand. Now we will probably at some point over-produce oil and gas and have another swing down.

So I think it is partly that energy behaves like the commodities market, like corn or cotton. Also, you have OPEC out there with more discipline than it has had before who is able to, at least for some period of time, dictate to the world market.

I personally think we need to get consumers concerned about low prices when producers cannot make money, and we have got to get

producers concerned about high prices when consumers cannot budget for energy.

One way of dealing with this, and this is a somewhat new idea, but take the Strategic Petroleum Reserve, and when the prices are going through the floor and companies are going out of business, buy product for the Strategic Petroleum Reserve, then sell when it is high.

Now, a lot of people do not like that. In recent years, there have been a lot of arguments on both sides that we should save this only for very, very special occasions. But I think, through trading, we would actually be able to buildup the reserve at no cost to the Treasury over time.

We got a false sense of security out of the Persian Gulf War, because Saudi Arabia was able to come in and immediately replace Kuwaiti and Iraqi production. We cannot count on that always being the case. Therefore, I would like to see the Strategic Petroleum Reserve back as a major part of U.S. energy strategy.

Senator GRAHAM. Do any other members of the panel have a comment on the issue of how to suppress wild price swings?

Professor KAMMEN. I think that the most critical feature to do that is actually to diversify the energy supply and to provide market access and entry for new technologies that can broaden this out.

As you mentioned in your earlier statement, we are now more dependent on imported oil than we were during the OPEC oil crisis. That is an absurd situation, given the U.S. remarkable resource of wind, of biomass, of solar, and building those energy markets is, in fact, the critical feature. That can be done by things like the renewable portfolio standard.

I believe, also, vehicle-based things, like a higher CAFE standard with credits for clean vehicles, hybrids, fuel cell vehicles, in time, are ways to buildup our capacity to build clean energy technologies that would then add to this diversity. Those would significantly bring down the volatility question with the energy costs.

Senator GRAHAM. Yes. Mr. Williams?

Mr. WILLIAMS. As I said in my testimony, Senator, we are predicting-and it is fairly uniform within the industry-that beginning in 2006, we are going to see retail energy prices increase dramatically with respect to gasoline and diesel fuel. That is just going to be because of a lack of refining capacity.

As our economy grows, the ability to feed that is not going to increase. We are all supportive of all of the alternatives that we can develop in this country, and feel that they should certainly move ahead with all haste.

But we have a fairly substantial period of time before we can get these to scale. So, in the meantime, we are going to be facing some shortages based on just a lack of refining capacity.

Senator GRAHAM. We have talked about one remedy, a new concept of what the Strategic Oil Reserve should be. Another, is increasing the diversity of sources. Then you raised the issue of seeing that our traditional sources continue to expand as demand expands.

Refining petroleum into various gasoline and diesel products is essentially a private sector activity. Why have we fallen behind in

our refinery capacity? Why has the private sector not, because it is in its economic interests, expanded the capacity to meet expectations of expanding demand?

Mr. WILLIAMS. Well, a lot of it is because of cost. Over the last several years, there has been significant de-bottlenecking, which has helped us increase our capacity on a fairly small annual basis. But the industry has really gone to the limit of that.

The cost of building new refineries, frankly, is prohibitive. The annual rate of return on replacement cost is probably somewhere down around two to 3 percent. For example, our refinery in Oklahoma produces 50,000 barrels a day. It is one of the smaller refineries in the country that is economic.

But the replacement cost on that facility, today, would be somewhere between $500 million and $600 million. That is on a refinery that averages less than $10 million a year earnings on an annual basis. If you take that and multiply that times any factory you want, you still end up with the same economic benefits. It is a very expensive proposition.

Senator BINGAMAN. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you very much, Senator.

Senator Murkowski?

Senator MURKOWSKI. Thank you very much.

It is kind of, I guess, revealing, and to a degree frustrating, for me to listen to the emphasis on renewables, which are important, but consist of such a small percentage of the energy we consume.

Now, we have been talking about renewables for a long time. That chart I referred to over there, back in 1992, emphasized renewables, probably with the same intensity that the conversation has addressed today.

We expended about $6 billion on renewables. It has been worth the effort. But the contribution is still less than 4 percent. Now, that is just harsh reality.

As we address energy, I think, realistically you have to separate the hydrocarbon oil, which is what America and the world moves on, from the other sources of energy, which are specifically for power generation.

Whether we have coal, nuclear, or hydroelectric, we do not move America or the world. We move it on oil. We do not have the technology developed to any significant degree to relieve ourselves of that, so we are going to be faced with the reality, in the interim future, at least, until we get some major breakthroughs of hydrogen or something else, on oil. We become more vulnerable all the time.

Now, Mr. Williams has indicated why the refining industry is not increasing its capacity. Dr. Hakes makes the point of the Strategic Petroleum Reserve. But how quickly we forget our last experiment when, under the previous administration, we had a crisis with heating oil.

The Secretary of Energy proposed relief by pulling 30 million barrels out of SPRO. Do you know what we found? We found it did not work because we did not have the refining capacity in this country. So all we did, was offset what we import.

What did we accomplish? What did we learn? Apparently, nothing. We got about three million barrels of heating oil into the mar-

ket, after all the folderol associated with this, as a great relief, a great relief valve.

We had some SPRO sales back in 1991 and we did another one in 1996. We bought high and sold low. We lost about $420 million. Is that right, Mr. Hall? You are shaking your head.

Mr. HALL. That is correct.

Senator MURKOWSKI. So I think, with the government's record of doing business and making money for the taxpayers, I do not have a great deal of confidence, Dr. Hakes, in the government's ability to address SPRO in such a manner that we are going to make any money on it.

But my question to you gentlemen is, let us focus in where the crisis is. We have lots of alternatives for generating power, but we do not for moving America. Are we simply going to be satisfied to increase our dependence on imports, or is it in the interest of our national security to try and decrease it?

To decrease it, you can only do it by recognizing that you are going to depend on domestic exploration here in the United States. Then the question is, do we have the technology to do it safely? What is the environmental risk?

One of the things that continues to amaze me, is the lack of any conscious awareness of where our oil comes from. We are importing 56, 57 percent. But do we give a damn whether it comes from a scorchedearth oil field over someplace in the Mideast? We do not even consciously address it. All we want is the oil.

But when it comes to domestic production, do we have the capability, the technology, the oversight with the EPA and our State regulations to do it right? Certainly, we do. But we can do it better.

Mr. Hall and Mr. Williams, you are out there in the real world. Now, what is the answer to America's transportation vulnerability, or is it simply more imports?

Mr. HALL. In my testimony I talked about two items, the counter-cyclical measures which maintain existing production, but I also talked about the fact of a "plowback" credit. Its intent is to bring in new capital into the industry. We have had a hard time bringing capital in which does the drilling, which is what we need today.

Senator MURKOWSKI. Well, you have got plenty of capital with the large oil companies.

Mr. HALL. With the smaller ones, it is very difficult to do.

Senator MURKOWSKI. We need a cap, I suppose, a floor and a ceiling, on stripper wells, as an example.

Mr. HALL. That would help, yes.

Senator MURKOWSKI. That is in this legislation.

Mr. HALL. That is correct.

Senator MURKOWSKI. Mr. Williams, do you have a comment-my time is almost up-on this predicament, the reality that America moves on oil? We are becoming more dependent and, therefore, the vulnerability of this country is at risk.

Mr. WILLIAMS. As I said, we are facing an upcoming product shortage in this country. When you trace the history of it, it is going to be because we have enacted tougher and tougher environmental standards on the making of those fuels over the years, which I said before is fine, and we all agree.

But we need to acknowledge the consequences of that. There has to be a lot of capital invested in the infrastructure of our country on the refining side in order to ensure supply in the future.

Senator MURKOWSKI. I agree with you on that. My time is up, but I want to recognize that reality. The concern over domestic exploration and development is environmental concern.

Now, there is a radical environmental group out there that does not want anything to happen on public land, then there are the realists. But can we develop domestically in a manner that is compatible with our legitimate concerns over the environment and ecology? Do we have the technology to do it safely, or is the risk too high?

Mr. WILLIAMS. I think we have the technology to do a lot of it safely. I think the question is going to be, ultimately, how self-sufficient can we be. That is going to be a supply demand issue.

Senator MURKOWSKI. Can we do it safely, gentlemen?

Professor KAMMEN. Absolutely, we can do it safely.

In fact, to address your question about that and renewables, renewables are a small percentage today because we have had policies in effect that limited their ability to enter the market.

The CHAIRMAN. What I would like to do here, is we are going to address his question a few minutes later. But Senator Lincoln is next, and I would like to give her time.

Senator MURKOWSKI. I assume your answer is yes.

Professor KAMMEN. The answer is yes. In fact, CAFE is a critical feature of that answer.

The CHAIRMAN. All right. I want to explore this. It is a very good point and I want to explore it a little bit later.

Senator Lincoln?

Senator LINCOLN. Thank you, Mr. Chairman.

I am certainly glad that this hearing focuses on both the supply and the demand for energy. We certainly cannot approach one without the other, and these issues are going to be forever linked. We just have to be vigilant on both fronts.

With refiners in this country operating at around about 95 percent of capacity-I believe that is the average, is that correct?

Mr. WILLIAMS. Yes.

Senator LINCOLN. We must work toward the goal of increasing our refining capacity.

We must also reduce our demand on our energy and resources and pursue some of the more efficient technologies in industry and in our personal lives. That always kind of hits close to home when we start figuring out that there is a lot we can all do individually that we are not.

Increasing production and refining are important and necessary, but conservation is the only thing that we can do that has an immediate impact. Obviously, the things that we talk about in terms of refining production, all of those, are going to take a considerable amount of more time in terms of producing results. Conservation does have an immediate impact, if we act on it quickly, on the energy that is available in this country.

One of the things I have been worked on, S. 686, the Resource Efficient Tax Incentive Act of 2001, which is a tax incentive that can play a crucial role in offsetting the high initial manufacturing

costs of new technologies. One of the solutions to the Nation's growing energy crisis, I think, must be to use more energy-efficient appliances in our homes, and certainly in industry.

Now, the use of high-efficiency appliances in our homes will not solve all of our energy crisis, but it is certainly a positive way that every family can reduce its individual energy bills.

I have been trying to practice a little bit of that in my own home as an encouragement. We, as a country, can achieve our energy efficiency and environmental goals if we all work more toward that end.

As Professor Kammen, I think, correctly pointed out in his testimony, new technologies may never be manufactured on a large scale or widely used due to their initial high cost and incentives can help manufacturers offset the high first cost premium for new technologies.

I would like to ask a question to Professor KAMMEN. I know you discussed it somewhat in your testimony, but maybe you would like to expand for us a bit on why manufacturers' tax credits are necessary for new technologies as opposed to just a consumer tax credit for the purchase of these new technologies.

Professor KAMMEN. The critical feature for new technologies has been that the initial costs are quite high, as you mentioned. Particularly for renewable technologies, almost all the cost is capital. There are very little fuel costs, often, by definition.

So credits for people doing research and development, for example, an R&D tax credit, and for producers, it is critical so they can then build enough market share.

I mentioned earlier on this feature where, when technologies can get rolling, we see this learning curve effect, where a critical feature is that if you can build market share and double, and double again the number of units produced of everything from solar panels, to fuel cells, to whatever else, we see steady declines in cost, often at a level of 20 percent for each doubling.

That means the technologies that are new, that have not gone through a lot of these doublings, are the ones where that has the biggest bite for your buck.

So, getting that side to get companies to enter into the business and to be able to produce technologies, then coupled with demand pull, that combination works and works dramatically well.

Senator LINCOLN. We heard some of that from the automobile industry yesterday. Certainly, it is hard to give a consumer a tax credit if there is not an appliance out there for them to buy.

Professor KAMMEN. Well, if I could follow on that, briefly. An interesting feature for vehicles has been that we have seen dramatic improvements in vehicles based on what the customer demand has been. The customer has demanded more services for cars that have more horsepower and all kinds of internal appliances. You can now watch movies in your minivans and SUVs.

That innovation has gone into better comfort, but has not gone into better fuel efficiency as much. If we had standards that set out better fuel efficiency, like the higher CAFE standard, that would encourage that innovation to go into those areas that would dramatically decrease our fossil fuel demand.

Senator Murkowski mentioned this problem of, oil moves America. Oil does move America, but we can dramatically cut down the amount we use. The fact that our corporate fuel efficiency is abysmally low has been a policy choice. We have chosen not to ramp those standards up with a long enough lead time so the companies can respond to that and make good economic choices.

But we could effectively double our fuel efficiency of the fleet over, probably, a decade. That would dramatically change the arguments for whether we need to explore, whether we need to open environmentally sensitive areas for short-term gains when we could achieve that at low cost through other means.

Senator LINCOLN. We could certainly probably set a better example from the Federal Government's standpoint, too.

Professor KAMMEN. Well, in fact, for the Federal fleet, it is a great place to begin.

Senator LINCOLN. Exactly.

Professor KAMMEN. It could do a great amount of work there.

Senator LINCOLN. Exactly. Thank you.

I know that Senator Graham has talked some about the refinery capacity and where we could be improving there. I know Dr. Hakes has touched on some of this before in previous discussions, but would just like to give you an opportunity to be a little bit more specific in terms of what, specifically, can be done to increase our refinery capacity and production in this country. Anybody, specifics?

Mr. WILLIAMS. Well, I think the first thing, Senator, that we need to do is make sure that we do not close any more efficient facilities that exist today. That is what I was addressing earlier in terms of the financial difficulties that surround at least the small refiners as to implementing the new de-sulferization rules and regulations, with which nobody disagrees, but the reality is, it is a huge financial commitment and at this point there is no guarantee of a pay-back. There never has been, so there is no reason why anybody would expect it or ask for it. But to preserve what we have in terms of the refining capacity in this country, it would be a great start.

Senator LINCOLN. For the small refiners.

Mr. WILLIAMS. Yes.

Senator LINCOLN. Small, large, existing, upstarts, anything.

Mr. WILLIAMS. All of the above.

Senator LINCOLN. Great.

Thank you.

The CHAIRMAN. Thank you, Senator.

This is the Finance Committee. We have jurisdiction over taxes, tax credits, and so forth. Earlier, we heard a little bit, if not tension, at least, the question of how much with respect to conventional versus renewable, and I think it is an honest question. The real question, to me, is how do we begin to answer that? Clearly, we want to make ourselves less dependent. We would like to have energy cost less, have energy costs be less of a component of our economy so we can just do more and do it better.

Conventional energy, as Senator Murkowski pointed out, is the big enchilada today and it may be for the indefinite future. Now we also have renewables. He pointed out, this is an oil-driven econ-

omy, a carbon- based economy. So, why all this talk here today about renewables? Really, that is just a very small part of the equation in terms of today's consumption.

So I wonder if all five of you could kind of just sit back a little bit and talk about, it is not really a tradeoff, but maybe they are complementary to each other, some way we could honestly just address that basic question.

Some, I think, are shifting away from conventional to renewables. Others might say, renewables are pie in the sky, just a lot of academic fluff stuff, and is not really part of the solution.

Dr. Hakes?

Dr. HAKES. I think I am slightly less bullish on renewables, the economics of renewables, than some of the panel members. For instance, I think we do have to remember that solar and wind are intermittent power, so they do not necessarily deal with your capacity problem, because you have got to have another plant out there to run when they are not running.

The CHAIRMAN. I am sorry for interrupting you. I guess what I am really asking, is how far do we push with tax credits, tax expenditures, and where do we draw the line with respect to conventional and renewables? What is the proportion?

Dr. HAKES. I think that you want to, at this point, slant the game in favor of renewables, for a couple of reasons. One, is wind, for instance, is a very good hedge against natural gas prices.

I mean, the biggest thing that is going to determine the future of wind is not the advances of wind technology, which are already pretty substantial, it is the future price of natural gas against which it competes.

So I would certainly like to have a strong wind industry out there to kind of hedge the future a little bit and give us more options for the future, and that will probably require some financial assistance, or some sort of mandate, like the renewables portfolio standard.

I think the other thing, is I have testified before the Congress previously on the climate change issue and suggested that, if we move boldly to reduce greenhouse gas emissions, that it is going to be very expensive. It is definitely going to be very expensive if we do not do anything in the short term to try to get options like renewables out there and tested more in the market.

Now, I am not saying a person has to have made a decision whether climate change is an issue, but I think if you are trying to manage your risks down the road and want to make sure that you do not face this tension between the economy and dealing with that issue, you are going to have to have some moderately to fairly strong measures in between that give us options like renewables that can be played at that point.

Right now, I do not think we are moving fast enough to have that option out there. I do think Senator Murkowski is right, there are very limited ways, you can run your automobile. Right now, oil is probably the best way to do it.

The CHAIRMAN. Mr. Hall?

Mr. HALL. I think renewables are very important, I think conservation is very important. But we have said, and it has been testified here, that we are at 56, 57 percent imports.

The only way you are going to get that down, and I believe the goal was to get it down to 50 percent, is to do more domestic drilling. We do not need to import more, but we actually need to start drilling.

We have the technology today to drill on a very small base and do directional drilling, going several miles out, several different directions, from a very small pad. So the technology, I think, is there to do more.

To provide some kind of credit or incentive to actually plowback the domestic drilling back into the production so it continues the operationin my written testimony I have laid out a couple of ways to do that. I think there are options out there that we can look at to do more domestic production to reduce the foreign imports, and I think that is important.

The CHAIRMAN. But how much effort should we pay to conventional, how much to renewables?

Mr. HALL. Oh, I think that is your decision.

The CHAIRMAN. Well, I am asking for your recommendation. I know you have a little bit of a conflict of interest.

Mr. HALL. Yes, I do.

The CHAIRMAN. But so do other panelists down there. So just put yourself in your shoes, and also the other guys' shoes. We are in America here. I know you have got an industry that you are representing.

Mr. HALL. I think, personally, from my personal perspective and in representing the industry as well, it is important that we do reduce our foreign dependency. I think it is important we do develop domestic oil production. But I think it is also important to encourage the alternative methods. I think the wind and solar are great.

I live in Bakersfield, California. We have a lot of wind over there, and out on the desert and Mojave side we have some wonderful solar plants out there, and they are working and functioning well. But it is a marriage between the two (oil and renewables).

Your question, what is the percentage? I think, in the short term, I would look at oil thinking you need to raise up some of these oil productions level to get the oil production going again. Once you get to an acceptable level, then the solar should come alongside of the oil industry.

The CHAIRMAN. Senator Lincoln, feel free to jump in here if you want. We are free-flowing here.

Mr. Williams?

Mr. WILLIAMS. Well, Senator, I would hope, in the long term, that there will be a major transition from the conventional fuels we have seen to new sources, and there are many new sources, I think, that might be developed.

The CHAIRMAN. How long is the long haul?

Mr. WILLIAMS. That is what I do not know. I think that we all predicted, and we had hoped, that many of the alternative sources would be more efficient than they have been. But a lot of these technologies are in the evolving stage, and I am certainly not an expert on it.

My concern at this point, is I think with the growth of our economy and the projected growth of our economy, that it is going to be important that, while we are investing in alternative energy

sources and trying to develop them and trying to make them commercially feasible, because ultimately everything has to be commercially feasible, that we not neglect what we have to do to bridge that gap in the near term, and that is to have, like it or not, as Senator Murkowski said, we are driven by conventional fuels.

We are going to be driven by conventional fuels for quite some time, and we are going to have to make sure that industry remains viable, while we can evolve the alternatives, whatever they may be.

Senator LINCOLN. I would like to jump in, just so that I make sure I understand what you all are saying.

Mr. Hall, when you talk about our dependency at 56 percent imports, getting that below or at 50, I mean, there is no way you can do that with just increased domestic production of oil.

Mr. HALL. You will be able to maintain what you have and not grow to the projected 63 percent that I think was testified to, so I think there is some benefit by doing more domestic drilling.

Senator LINCOLN. Oh, no doubt. But I just want to make sure I understand that you are not——

Mr. HALL. I am not saying you can reverse the trend. That is correct.

Senator LINCOLN. Right. All right.

Mr. HALL. But you can slow it down tremendously, and I think that would be supported.

Senator LINCOLN. You can slow it down by, certainly, increased domestic production.

Mr. HALL. That is correct.

Senator LINCOLN. But without the others that we are talking about, I mean, you are not going to be able to get to that 50 percent objective.

Mr. HALL. No. That is correct. There is a marriage between the two, and I think that is important.

Senator LINCOLN. Right.

Mr. HALL. I think that is partly your decision to make as to what that mix needs to be. But I think, for the short term, we are driven by a carbon-based economy, so therefore we do have to shore up domestic oil production.

We have lost a tremendous amount of employees through the last downturn. There has been a tremendous number of qualified, skilled people that have left the industry, and other industries, because of the oil price dips.

One of the counter-cyclical measures, obviously, is trying to flatten out some of those large swings. All of us here have testified that we have suffered those large swings.

So I think the opportunity of putting some counter-cyclical measures in law puts a floor so you do not have people leaving the industry. I talked to people that are on the drilling site, and they just cannot get qualified employees to come to work as drillers due to the up and downs of the industry.

Senator LINCOLN. Touching on what the Chairman mentioned, which is, this is the Finance Committee and we are looking for the solutions that we can provide to the energy crisis that is out there, Mr. Williams, I mean, you offered an idea in terms of small refineries, and perhaps something that we could be doing there.

But are there any other suggestions that you all offer in terms of being able to get more of a refined product to the consumer? I mean, drilling domestically and producing more oil is fine, but unless we get it into the form of gasoline, diesel, or home heating oil, we have not done a whole lot, right?

Mr. HALL. Right.

Mr. WILLIAMS. Well, there are proposals, Senator, as to the refining industry, specifically. But, ultimately, we are going to be talking about conservation.

For example, right now, with the new standards that have been proposed for automobiles, when they come into effect and consumption and miles-per-gallon improve one more time, that will put some easing on our refining capacity in the future. However, it will not solve the problem. It is much the same as you have from the production side. We may be able to cut down imports some, but we cannot eliminate it.

We may be able to cut down on imported, refined product over the future and we may be able to increasingly supply the consumer their transportation fuels, but we will not be able to fulfill all of the demand, given the present status of the industry.

The country is going to have to decide how much money we should invest in the infrastructure to enable us to go forward while we are waiting for alternative sources of energy to come into play.

The CHAIRMAN. Let us say our goal is to be less than 50 percent, say, 49 percent of our consumption is imported oil. Realistically, how long does it take to get there? Realistically.

Professor KAMMEN. Coming from the academic, the estimates are not that long. In fact, the possible changes in fleet efficiency that we could enact are fairly rapid.

The administration has proposed testing vehicles this coming year that would be in the 50-plus mile-per-gallon range. That would indicate that, in a few years after that, we should be able to get those types of vehicles on the road.

The CHAIRMAN. But, just generally, how long is it going to take, assuming that we make a reasonable effort at achieving that goal?

Professor KAMMEN. Your reasonable effort, I believe, will involve building this market for these renewables. For things like fuel cells that can use a range of fuels, biological fuels, oil, et cetera, that would give us a time scale of a couple of years, 5 years, to get us to that point.

The CHAIRMAN. All right. That is a complicated answer. How many years, and what is the mix? You guys are experts. You think about this a lot when you are driving to and from work.

Professor KAMMEN. Even at work.

The CHAIRMAN. You have got a gut guess about this stuff. All I am asking for is a gut answer, nothing really very precise.

Mr. Williams?

Mr. WILLIAMS. Senator, I hope to live a normal lifetime.

The CHAIRMAN. I hope you do, too. We all hope that you do.

Mr. WILLIAMS. But I do not believe that, in my lifetime, I will see us with less than 50 percent of our energy imported, unless we have a dramatic change. It is going to have to be something that is going to have to be very heavily subsidized by the government,

because I do not think private industry can do it, a change in the way we use transportation fuels.

The CHAIRMAN. Anyone else want to venture out and give us their opinion on how long it would be?

Dr. HAKES. Would this involve us withdrawing from the World Trade Organization? [Laughter.]

The CHAIRMAN. No. I think that would be difficult.

Dr. HAKES. I am a strong supporter of efficient automobiles, but I do not think the efficiency of the automobiles has a big impact on the share of our petroleum that is imported. I think it is the cost of production here versus other places, and rules that we have in place.

I think we could adopt almost every policy that has been suggested today and we would not get there. If you want to get there over the long term, it seems to me that probably ethanol-and this would be not so much corn-based ethanol as other forms in the future-would still require a lot of research and development work to develop those distillation policies. I think that is something that needs to be looked at, but you are talking about decades down the road for that.

The CHAIRMAN. All right.

Professor Kammen?

Professor KAMMEN. If we look back at the energy economy from the OPEC oil crisis, the projections made by the oil and gas industry at that time was that the U.S. economy would be using, today, between one-and-ahalf and two times our current use of energy.

So, energy efficiency has been the cornerstone of energy policy. At the same time, we have seen a great increase in the amount of overall energy use.

Those sorts of initiatives could be applied to renewable energy, combined with energy efficiency, to, I believe, on a much more rapid scale, and economically at a benefit, make this transition happen. I think we could conceivably do this on the order of a decade if we set up policies to open markets.

The comments why the renewables are still a small fraction of the market is because we have essentially legislated that. Up until only a few years ago, renewables were almost exclusively brought into markets as niche components to make up for the difference in what we thought a given utility might see as a shortfall.

So things like the PURPA credits for renewables were ones that provided a niche share, but it was all at the economic benefit of the existing oil industry. So that renewables would be given a market share at, for example, the avoided cost for production of fossil fuels.

If you want a balance, here is what we are talking about here, because these things all contribute overall to the energy mix, you need to help to build those markets up. Those can happen fairly quickly.

We have seen in Texas and in California, renewables have ramped up rapidly. Right now, they are at that critical jump-off point where tax incentives and clear market signals today can provide that dramatic increase in the amount of renewables we are using. That would solve this, Mr. CHAIRMAN.

The CHAIRMAN. What was the biggest driver in achieving efficiency in the last, what, 10, 15 years?

Professor KAMMEN. It has been two things. One critical thing, was a combination of some clear standards, like the issues that went on for compact fluorescent lighting, when States initially, then the Federal Government, came in and set standards.

The Federal Government, through efforts at the EPA and DOE, provided not just a little bit of financial incentives, but a great deal of educational efforts. So, the EPA and DOE come in, for example, and do energy audits for buildings.

The CHAIRMAN. All right. That is one.

Professor KAMMEN. That is a key piece.

The other feature, was finding ways to provide some sustained research and development for areas that needed it, but then transition that into market-based credits.

So, for example, there were times when you could build a windmill-this was in the 1970's-rent the land from the farmer or whoever else, and never hook up and make money. That is an absurd credit. That is a credit based on building hardware and not producing clean kilowatts or clean gallons of fuel.

Credits, now, that are based on sustainable production targets make much more sense. Those are targets that actually can open markets for renewables and help them to complement what the fossil fuel economy does.

Fuel cells are a neat example. They provide a technology that can be used for stationary power and for vehicles, and can use fuels that range from gasoline, to ethanol, to methanol, to pure hydrogen produced from solar and wind.

There is the technology that, if it enters the market in a large degree, would provide a whole range of options and, critically, ways to transition. That is the kind of technology that we should support.

The CHAIRMAN. What about duration, phase-in, phase-out, of tax expenditures to encourage either production or conservation? We have talked about this a little bit, how short duration causes volatility and is inefficient.

Of course, you do not want something permanent. In some industries, some technologies become competitive. What do we do, just kind of enact something and kind of watch it after every 3 or 4 years?

The trouble is, once a provision is in the Code, it is a little hard to take out. That is a "tax increase." Or just enact a phase-out. I mean, in for a couple of years, then it starts to phaseout and we can address it. I know we cannot have a one-size-fits-all here, but just a little more guidance on duration.

Mr. SINGH. Senator, for renewables, one of the reasons I mentioned the permanency issue was just to hit on the theme of surety. There has to be some level of surety for investors to know that that will be there for them to benefit from when they put money into something like a wind project.

Again, we have heard from wind folks that it takes a number of years, and from geothermal folks, to put a project into the ground, to site it, to get the transmission hooked up. We have to take that into consideration, I think, when we think about tax credits.

I think there are different technologies that are all close to the cusp of being economic. Wind is the closest. Biomass and geo-

thermal are not far behind. I think extending it for a period whereby we have several years in there for them to ramp up even more in terms of cost productions, I think, would be a wise thing for the Production Tax Credit. That would ensure that the tax credit is hitting as many technologies, and probably hitting as many megawatts as possible, over a certain period of time.

The CHAIRMAN. All right.

Yes, Mr. Hall?

Mr. HALL. I would like to address the fact that a lot of the Marginal Well Tax Credits, as we have talked about earlier here, ensures that production.

Marginal wells, at least in California, comes from heavy oil. Heavy oil is the most costly to produce. It receives the least amount of dollars (in price) of any oil that is produced in our industry. We have a $5 to $11 price differential between WTI oil price and the heavy oil that's received in California, so it costs more to produce and we get less dollars for our oil.

The credits help keep those marginal wells open, and for a much longer period of time. The marginal wells, in total, if I believe correctly, equals the production from Saudi Arabia.

The CHAIRMAN. Are you talking about marginal, or strippers, or what?

Mr. HALL. Well, altogether, if you look at marginal heavy oil and the strippers, you are looking at those wells that produce under 25 barrels a day, or even 15 barrels a day, and look at the heavy oil, you are going to look at a category that equal Saudi Arabia's oil import to the United States. So, you are extending that to include marginal wells, heavy oil and stripper wells.

The alternative, like the Section 29 credit for the tar sands, if that credit goes away-we have talked to the people in production that-their production will drop 50 percent the moment they stop steaming, because they cannot afford to continue because they can not afford to operate without the credit.

So the credit does subsidize and keep them in business, and that is kind of a new industry for California, the tar sands. They have been able to finally figure out how to put steam that far down into the ground and make it viable enough to get the oil back out of it. So, there are benefits. There are long-term benefits.

But, as stated earlier, if you put a credit in and take it back out, the market dries up, whether it is in alternative fuels or whether it is in our industry. It is going to have an impact when you start and stop something.

The commitment needs to be made on a long-term basis for a long-term energy policy of a combination of a lot of different things. It cannot be just a short-term policy.

The CHAIRMAN. That is interesting, and it is unfortunate. We here enact tax provisions, hopefully based upon good policy, and the Congress tends to trim back, not for policy reasons, but for budget reasons.

Mr. HALL. Correct.

The CHAIRMAN. We do not really look at the policy reasons behind the cuts. It is because we are in a room and we have got to make a deal, and figure out how to make this fit in the budget, and

so forth. It is one of the shortcomings of the process here. Basically, I think it works, but it is a shortcoming.

I do not have anything else. I will give any of you a chance to say anything if somebody said something outrageous, or that needs to be corrected, and so forth.

Yes, Mr. Singh?

Mr. SINGH. Senator Baucus, there was the issue of capacity that Dr. Hakes mentioned. I really want to fill out the information on that.

There was the claim that, if you put in a megawatt of wind or solar, you have to put in another megawatt of fossil fuels to back that up. That just is not true, from our experience.

There are some very interesting facts. In California, the best wind sites peak during the summer when California needs power the most. On a daily basis during the summer, the wind peaks in a way that very much overlaps with the daily peaks for electricity demand in California.

Now, you cannot predict, hour by hour, how the wind is going to blow. But by putting the turbines there, you will know that, over a 10 to 20-year period, it will, overall, deal with a lot of those peaks. Utilities, all the time, deal with fluctuating demand. This adds a little bit of complexity to that.

But nations such as Denmark have 10 percent of their electricity coming from wind. There are clear ways for utilities to be able to deal with that daily intermittency, while knowing that, over a 10to 20-year basis, it is going to help shave some of those peaks in California. In Alaska, it peaks in the wintertime, which is when they use their electricity the most.

One of the measures of capacity is, how does it coincide with demand? Wind is fantastic, as is solar, in New York City, on the east coast, in places like Nebraska. It coincides very well during the summertime, which is when you need the electricity. So, renewables serve as a very good peak.

Dr. Hakes does have a point, it does not have as high of a capacity factor as fossils. But we have excellent data on when the wind blows and when the sun shines. We know, on average, when it is going to happen.

You do not need a megawatt of fossil fuels to back up a megawatt of renewables. Every kilowatt hour of wind in California is going to be very valuable because it is coming out at a very valuable point of the year.

The CHAIRMAN. Dr. Hakes, do you want to comment on that?

Dr. HAKES. Well, I do not think you need a one-for-one backup, but I think you cannot compare a kilowatt hour of cost of renewables with a kilowatt hour of cost of fossil fuels, because you do have to have some back-up for the intermittency of the power.

I think most of the studies of wind see it primarily playing a role as saving the cost of natural gas at certain levels.

So it seems to me that, if I was arguing for wind, I would make the climate change argument, I would make the hedging the natural gas argument, before I would make the capacity argument. I would not lead with that argument for wind.

The CHAIRMAN. All right.

Professor Kammen, you have got the last word.

Professor KAMMEN. I think there was one mistake being applied here, in that one should look at individual technologies and say, can this technology provide X market share, or Y.

The critical lesson we have learned from 30 years of work on efficiency, conservation, and renewables, as well as a diverse set of fossil fuel supplies, is that these things work in concert and that wind provides power at a critical time, solar at a different time, and biomass energy can be a baseload feature.

The CHAIRMAN. Right.

Professor KAMMEN. In fact, Vermont and other States are having dramatic improvements in gassification of biomass. These things work if you put a package together.

The unfortunate thing that I see in the current national energy policy plan, the Bush-Cheney plan, is one that over-emphasizes a given share and does not build out this diversity of supply.

That is the way to overcome this issue so that you do not have to do a one-forone backup of wind and gas, which I would certainly disagree with. It is that range, it is providing enough market share so new technology could enter in and then be evaluated in the market. That is the critical lesson.

The CHAIRMAN. Well, thank you. This has been very helpful. You have been great in helping us solve this problem here. We will have a lot of other conversations, I am sure.

The hearing is adjourned.

[Whereupon, at 12:06 p.m., the hearing was concluded.]

APPENDIX

ADDITIONAL MATERIAL SUBMITTED FOR THE RECORD

PREPARED STATEMENT OF JAMES S. CANNON

The United States urgently needs to transform its transportation sector to address critical national energy security, environmental and public health concerns. I appreciate being invited to comment today on the challenge we face, on the progress made to date in a shift to advanced propulsion systems and cleaner fuels and on the importance of financial incentives in a national strategy that will move our country more rapidly toward sustainable transportation. At stake in the decisions we make about our transportation future today is our energy security, the strength of our economy, the health of our environment and our children, as well as our competitiveness in the global transportation marketplace of the 21St century.

I am offering this testimony on behalf of INFORM, Inc., a 26 year old national not-for-profit environmental research organization, based in New York City. INFORM identifies and analyzes innovative business practices, technologies, and products that can enable our society to move steadily toward environmental sustainability. We provide government, business and environmental leaders with concise and thoroughly documented information on the effects of business and municipal practices on the environmental and on public health and on options for change.

Since 1986, one major focus of INFORM research, an area in which I have provided continuous leadership, has been on US transportation issues. We have analyzed the range of alternative vehicle fuels and advanced vehicle technologies as well as public policies that can ensure the most rapid progress toward an era of sustainable transportation. We have published almost a dozen groundbreaking reports on the need and options for a shift to cleaner, more energy efficient vehicles. These reports have become widely used resources around the world, and INFORM has become known as a leading authority in this field.

INFORM's reports have included Drive for Clean Air (1989); Paving the Way for Natural Gas Vehicles (1993); Harnessing Hydrogen: The Key to Sustainable Transportation (1995); Spotlight on New York: A Decade of Progress in Alternative Transportation Fuels (1997); Gearing Up for Hydrogen (1998); Bus Futures: New Technologies for Cleaner Cities (2000); Clean Transportation for New York: A Long Road Ahead (2000); and Green Transportation for New Jersey: The Promise of Clean Fuels (2000).

CONTINUED RELIANCE ON OIL-DERIVED FUELS IN TRANSPORTATION

There are many reasons why the transition to clean alternative fuels and advanced engine technologies in transportation deserves to be a top national priority. Given the focus today on our country's energy policy, it is important to first point out that the 217 million cars, buses and trucks traveling US roads are the main reason for our country's steadily rising, dangerous reliance on foreign oil. They consume 67% of the nation's oil—more than our entire national production. In 1975, transportation consumed 53.8% of US petroleum products, and 35.8% of US oil was imported. Today, transportation not only consumes almost 67% of US petroleum products, but almost 60% of our oil comes from foreign sources. Energy use for transportation grew 43% between 1975 and 1999, outpacing the growth in total energy use of 15% from all sources. The conventional propulsion system used in motor vehicles today, with its well-to-wheels efficiency of only 12 to 15%, acts only to make the situation worse. Without the transportation sector, national energy use actually declined 17% during this period.

With US reliance on foreign oil growing, with much of the developing world now aspiring to replicate our gasoline and diesel-dependent transportation systems, and

with China's oil imports already approaching 30%, world competition for shrinking global supplies is bound to escalate rapidly in the decade ahead. Assuming a continuation of recent trends in global oil use, the world is likely to consume as much oil in the period from 2000 through 2020 as it has consumed in the entire industrial era dating back to the mid-1800s. The growing worldwide demand for oil combined with the control over the market demonstrated time and time again by the oil producing nations represents one of the most significant security threats to the United States.

In addition to energy independence, there are compelling environmental and health reasons to make transportation innovation a primary goal. Vehicle emissions are the largest source of air pollution in the US, accounting for 30% of the primary smog-forming pollutants emitted nationwide and 28% of the lungchoking fine particulates emitted from combustion sources. Because of vehicle emissions, 121 Air Quality Districts in the US now violate the 1970 Clean Air Act's National Ambient Air Quality Standards—18 years after the 1982 deadline for compliance. Vehicle emissions cause 60–90% of air pollution in cities.

Vehicle emissions are damaging the health of a generation of our children. Emissions from diesel trucks and buses are a primary culprit in the virtual asthma epidemic sweeping this country. According to research by the Pew Environmental Health Commission, between 1980 and 1994, asthma rates rose by 75% overall and by 160% among children under four. The Commission forecast that asthma victims would more than double within 20 years from 14 million to 29 million by 2020. While all the reasons for the rising asthma rates are not understood, diesel emissions are widely recognized to be a central trigger for asthma attacks. Such attacks have increased 100% among children in the US in the past decade. They have become the most common cause of hospitalization and the main cause of children's absenteeism from schools.

Furthermore, a growing number of public health-related organizations in the US and abroad are linking diesel emissions with cancer. The National Institute for Occupational Safety & Health and the International Agency for Research on Cancer (WHO), in 1988 and 1989 respectively, identified them as a "potential" or "probable" human carcinogen. The State of California (1990) and the US Environmental Protection Agency (1998) have now respectively labeled them a "known" or "likely" human carcinogen. Children in the US, whose developing systems are most vulnerable to toxic impacts, are doused with diesel particulates in every major US urban center—by trucks, transit buses and even by most of the 445,000 yellow school buses that carry 23 million of them to and from school each day.

Transportation-related emissions also generate more than a quarter of the greenhouse gases that make our country by far the leading contributor to global climate change. Despite international concern, greenhouse gas emissions in the US increased 11 % from 1990 to 1998. This may be the ultimate threat to our children and the world they inherit.

INFORM'S SUSTAINABLE TRANSPORTATION VISION

There is little disagreement that the world will have to move away from oil-derived fuels to modes of transportation that are sustainable—i.e., pollution-free and based on the use of renewable resources. The main questions are what our transportation future will look like and how rapidly we can get there. In a world of six billion and growing, the US needs to address as expeditiously as possible its own severe transportation-related energy and environmental problems by charting a course to sustainable transportation. By taking aggressive action now, we also have the opportunity to provide global leadership and to flourish economically in the emerging "green fuels and vehicle" marketplace of the future.

Research that INFORM conducted for our 1995 report, *Harnessing Hydrogen: The Key To Sustainable Transportation*, first clarified for us the exciting potential that fuel cell vehicles, powered by renewable and pollution-free hydrogen, held as perhaps the ultimate "sustainable" mode of vehicle transportation. And debate over the ensuing years has produced a growing consensus among government, industry and environmental leaders that this will be the case. In the remarkable fuel cell, soundlessly—seemingly by magic—hydrogen is merged with oxygen through an electrochemical reaction, releasing usable energy as electricity and a few drops of water as the only by-product.

We already know how to make the fuel we will need. We can make hydrogen from water using solar energy today, which gives us a totally pollution-free fuel cycle, but solar electric systems are at least a decade or two away from full commercialization and economic viability. We have, however, made hydrogen for several decades for the US space program by the well-known process of "steam reforming." Natural gas

has served as the feedstock for this purpose because it is mostly hydrogen (it contains four hydrogen molecules and only one carbon molecule), and the bonds holding its molecules together have proven easy to break. Hydrogen can be distributed through the existing natural gas pipeline systems (up to a 20% mix with natural gas). Equipment for steam reforming natural gas could also be readily installed at the gas station level, wherever natural gas fuel is available there. This would enable expanded demonstration of hydrogen fuel cell vehicles, bringing the day when they are fully commercial closer.

While agreement on the long term goal for sustainable transportation has grown, there is much debate over what to do today to get there. What fuels to promote? What engine and vehicle innovations to invest in first for what kinds of vehicles? These are complex issues. But from INFORM's analysis of fuel and vehicle options, we have drawn some conclusions regarding what may well be one of the most direct and rapid paths for the US to sustainable transportation.

We see two fundamental system shifts that can most readily and elegantly be made side by side. One major shift is from the conventional propulsion system powered by internal combustion engines to more efficient propulsion such as the hybrid electric system and ultimately to the fuel cell. The other shift is in fuels—from oil-derived, high carbon gasoline and diesel fuels to much cleaner fuels, natural gas in particular, and, eventually, to hydrogen.

With regard to fuel alternatives, INFORM research has found natural gas to have many benefits: being the most plentiful of all the options in this country and to our north and south, being safe, emitting 90% fewer pollutants and virtually no toxic constituents. It can be used to power a wide range of modified internal combustion engines today as well as to power advanced vehicles including fuel cell vehicles, until solar electric hydrogen is a viable fuel choice.

It is still possible to increase vehicles fuel economy and reduce air pollution somewhat while clinging to our gasoline and diesel fuels using advanced power systems. By doing so, we could postpone an expensive investment into refueling infrastructure for alternative fuels. But as our vehicle population grows, this strategy alone would be throwing good money after bad. And the price we pay may involve continued deterioration of public health, deterioration of our relations with countries around the world who are deeply concerned about global warming, and the need to compete for the shrinking global supplies of oil.

By making a strong commitment and using adequate government incentives to promote a shift to cleaner fuels *and* advanced electric propulsion technologies now, we can assure a cleaner environment in the near term while building a bridge to the hydrogen energy economy and the era of fully sustainable transportation in the longer term.

OBSERVATIONS AND RECOMMENDATIONS

I would like to make four points that convey the progress made by the alternative fuels and advanced transportation industry during our 15 years of study and examine the implications of this progress on future transportation energy policies.

The Alternative Fuel Vehicle (AFV) Industry Has Emerged

When I began my research of possible alternative fuel vehicles (AFVs) in 1986, there were virtually no AFVs marketed by original equipment manufacturers (OEM) in the US. The limited number of aftermarket vehicle conversions to alternative fuels were not subject to EPA emission certification requirements. There were no AFVs at all in entire transportation market sectors, including buses. There was not a single operating fuel cell powered car.

In 15 years, I have seen the stirrings of a virtual transportation revolution. Today, nearly every major automaker in the world is marketing at least one AFV model. Annual OEM sales worldwide are measured in tens of thousands of vehicles. AFVs are being used for virtually every transportation application from fork lift trucks to semis. Over 7 percent of buses in the US are using alternative fuels (nearly all natural gas). The private sector is investing billions of R&D dollars to commercialize fuel cell vehicles.

The US Energy Information Administration (EIA) has been monitoring the growth in AFVs in the US since 1992. Table 1 summarizes the most recent EIA data released in February. The number of AFVs operating in the US continues to increase. The latest data estimate that 432,344 AFVs were operating in the US in 2000, a 6.4 percent increase compared to 1999. Based largely on the mandates on federal, state government and alternative fuel provider fleets, the EIA projects the number of AFVs to increase another 5.5 percent, to 456,306, by the end of 2001. The number of AFVs in the US has grown by a total of 75 percent since 1992. When vehicles powered by liquefied petroleum gas (LPG or propane) are excluded from the anal-

ysis, the number of AFVs powered by other alternative fuels has jumped by 600 percent.

TABLE 1

ALTERNATIVE FUEL VEHICLES IN THE U.S. 1992 TO 2001

Alternative Fuel Vehicle Type	1992	1994	1996	1998	2000	2001
Liquefied Petroleum Gas (LPG)	221,000	264,000	263,000	266,000	268,000	269,000
Compressed Natural Gas	23,191	41,227	60,144	89,556	100,530	109,730
Liquefied Natural Gas	90	484	663	1,681	1,900	2,039
Methanol (M85)	4,850	15,484	20,265	18,964	18,365	16,918
Methanol (M100)	404	415	172	198	195	184
Ethanol (E85)	172	605	4,536	22,464	34,680	48,022
Ethanol (E95)	38	33	361	14	13	13
Electricity	1,607	2,224	3,280	6,964	8,661	10,400
Non-LPG Total	30,352	60,472	89,421	139,841	164,344	187,306
Total	**251,352**	**324,472**	**352,421**	**406,841**	**432,344**	**456,306**

LPG vehicles continue to account for most of the AFVs in the US. However growth in the number of LPG vehicles since 1992 has been meager, from 221,000 to 268,000 in 2000. Natural gas vehicles (NGVs) rank as the second most popular AFV in the US. Unlike LPG vehicles, NGV use has grown dramatically. The number of NGVs has increased from 23,281 in 1992 to 102,430 at the end of 2000.

Ethanol powered AFVs are also on the increase, although there are still less than half the number of ethanol vehicles as NGVs. The number of various types of vehicles powered by electricity has soared ten-fold since 1992. The advent of hybrid electric vehicles (HEVs) into the US market two years ago is propelling a rapid increase in this sector. Methanol vehicles have declined since reaching a peak in 1996. However, methanol is still being considered as a possible energy source for fuel cell vehicles. Although there are no commercial fuel cell vehicles today, a number of major automakers have committed to begin commercial production starting as soon as 2004.

Government Programs Have Served as a Catalyst

For the first time in nearly a century, alternative fuels and propulsion systems are shown that they have the potential for challenging the prevailing transportation paradigm. The last transition—from oats to oil—took about 40 years before the gasoline burning automotive replaced the horse drawn carriage. The national security environmental, health and economic problems associated with our dependence on oil dictate that the new transformation must occur much more rapidly.

The federal initiatives to promote alternative fuels—the Alternative Motor Fuels Act of 1986, the Clean Air Act Amendments of 1990 and the Energy Policy Act of 1992—have focused the attention of the private sector and, to a much lesser extent, consumers, on AFVs, propelled major investments in R&D, and accelerated the commercial introduction of new fuels and technologies. Federal initiatives have been mirrored by a plethora of state AFV programs. We have documented more than 30 states that have enacted significant AFV legislation in the past decade. The National Conference of State Legislators has recently issued a report that identifies about 200 specific AFV mandates, and incentives on the books at the state government level.

The combination of federal and state policies has resulted in a significant improvement in AFV technologies, but not significant market penetration. The advances in AFV technology made by US manufacturers have had a worldwide impact. I remember a series of meetings in Buenos Aires, Argentina, a decade ago to discuss the global implications of the transportation portion of the 1990 Clean Air Act. I recall a presentation in Aachen, Germany, a half a decade ago by an automaker analyzing the impact of the California zero emission vehicle program on his company's production—in Poland. Just a month ago, I attended a workshop in Hong Kong where discussion focused on the viability of US-style AFV programs to help that city maintain its spectacular natural beauty in the face of skyrocketing auto

emissions. US leadership has framed the debate about future transportation needs, established the global parlance of the transportation revolution, and jump started a private sector race for leadership in the emerging transportation markets. Past government actions have positioned us to make progress, but we have barely taken step one along the road to sustainable transportation.

The Job Is Far From Done

Despite the progress to date, the new transportation industries are not even close to being selfsustaining. Our national energy security and environmental problems remain unsolved. AFV use remains sparse compared to the size of today's automotive industry. Nearly all of the 90 automobiles manufactured worldwide every minute burn petroleum, and nearly every one of the 6,000 gallons of gasoline burned in US vehicles every second are used in conventionally powered vehicles.

Fuel alternatives to gasoline and diesel have barely made a dent in the US. As shown in Table 2, alternative fuels displaced 353.7 million equivalent gallons of gasoline in 2000, according to EIA data. While this represents an increase of 54 percent since 1992, the total amounts to just 0.22% of total transportation fuel use. Excluding LPG, there has been a ten-fold increase in the use of other alternative fuels since 1992. Alternative fuel use is projected by the EIA to increase 3.6 percent between 2000 and 2001, still just a drop in the bucket.

TABLE 2

TRANSPORTATION FUEL CONSUMPTION IN THE U.S. 1992 TO 2001
(thousands of gasoline equivalent gallons)

Fuel	1992	1994	1996	1998	2000	2001
LPG	208,142	248,467	239,158	241,583	242,695	243,196
CNG	16,823	24,160	46,923	73,251	97,568	107,476
LNG	585	2,345	3,247	5,343	6,847	7,566
Methanol (M85)	1,069	2,340	1,775	1,212	996	918
Methanol (M100)	2,547	3,190	347	449	437	406
Ethanol (E85)	21	80	694	1,727	3,344	4,575
Ethanol (E95)	85	140	2,699	59	54	51
Electricity	359	430	773	1,202	1,819	2,143
Non-LPG Total	21,489	32,685	56,458	83,243	111,065	123,135
Alternative Fuel Total	**229,631**	**281,152**	**295,616**	**324,826**	**353,760**	**366,331**
Gasoline	110,135,000	113,144,000	117,783,000	122,849,000	124,651,000	126,284,000
Diesel	23,866,000	27,293,370	30,101,430	33,665,360	36,799,340	37,581,000
Alternative Fuel as % of Total	0.17%	0.20%	0.20%	0.21%	0.22%	0.22%

The AFV and advanced vehicles technology industries have not yet reached the point where sales are high enough to produce economies of scale in manufacturing and a lowering of unit costs to the levels achieved by conventional technologies. Consequently, most AFVs, HEVs and fuel cell vehicles continue to cost substantially more than conventional gasoline or diesel vehicles. Moreover, most alternative fuels require a major investment in fueling infrastructure in order to attain the level of availability and reliability motorists take for granted when they drive. There are only about 6,000 AFV fueling stations in the US today, compared to 180,000 station dispensing gasoline or diesel fuel. The higher cost of AFVs and other advanced technology vehicles combined with the slow pace of development of needed fueling infrastructure have sharply curtailed consumer demand. Until the economics of these vehicles and fuels improve, the role of AFVs, HEVs and fuel cell vehicles in the mar-

ket will be limited and the potential energy security, environmental and health benefits they offer largely unrealized.

Government Must Play a Stronger Leadership Role

The nation's energy security and environmental problems are severe. We need a response equal in scale to the magnitude of the problems themselves. This requires even more ambitious government leadership. Fortunately, the accumulated experience of the past 15 years provides a wealth of information to help guide future energy policies for the us.

There are several important lessons to be gleaned from the past.

- The first is about mandates: In general, although mandates help focus attention and prompt action in the private sector, they have been met with increasing opposition over time that has undercut their usefulness as policy tools. This issue has been examined recently by the General Accounting Office.
- The second is about consumers: While consumers express enthusiasm for clean air, are excited about new technologies and are willing to take some risk, they have resisted incurring any significant incremental personal expense to buy AFVs. They have, in fact, increasingly purchased expensive sports utility vehicles, known for their extravagant use of fuels and high pollution levels.
- The third is about financial incentives: Experience shows that when financial incentives are available, consumers and industry respond. When consumers are economically neutral with respect to the price of a vehicle, as is the case with the two HEVs now on the market, sales are robust. Sales of the Toyota Prius in the first quarter of this year totaled 3,874 vehicles, well above company projections. More than 1,000 Honda Insights were sold in the first quarter, a 166 percent jump over sales in the same period last year.

Our analysis suggests that well defined financial incentives are needed to accelerate the pace of the shift in this country to advanced vehicles and alternative fuels. Tax incentives seem especially well suited to meet the challenges that lie ahead, but only if they are scaled to meet the scope of the problem.

Tax incentives can offset the high front-end costs of AFVs and fueling stations. They can be adjusted to reflect the particular needs of individual fuels and technologies, thereby helping to create a level playing field for all challengers to conventional fuels and engines. They are relatively easy to administer, and they provide assured financial benefits to consumers as quickly as costs are incurred.

In order to be successful, tax incentives must be sufficient to make the decision to buy an AFV or HEV or fuel cell vehicle economically neutral. This is especially true for alternative fuels, which require major investments in infrastructure, and for advanced vehicles that incorporate major technological innovations. Properly constructed, incentives offer a voluntary, market led strategy to defray incremental costs until production levels are high enough to achieve economies of scale. They can also be instrumental in defraying infrastructure costs associated with AFV refueling.

If tax incentives are to be effective in achieving multiple national goals, they must:

- Increase with the energy efficiency of fuel use and, concomitantly, with the level of reduction in greenhouse gas emissions
- Increase with the degree of pollution reduction offered by the vehicles protecting our environment and safeguarding public health.

The incentives offered in S. 760, the "Clean Efficient Automobiles Resulting From Advance Car Technologies" Act are consistent with these requirements and are particularly well suited to stimulate sales of AFVs, HEVs and fuel cell vehicles. Although tax credits seem especially attractive, experience shows that other financial incentives can work as well. Grant programs, such as State Energy Program grants under the federal Clean Cities program and the Carl Moyer program in California are examples of grant-based initiative that appear to be working well. The new Wendell Ford Aviation Investment and Reform Act, providing $20 million to cover refueling infrastructure and the incremental costs of vehicles for airport use, offers promise as well. Rebate programs are also proving to be effective, and they avoid the difficulty of extending tax credits to tax exempt entities. To have a measurable impact on the market, however, grant and rebate programs must offer substantially more funding than has been the case to date.

Mr. Chairman and members of the Committee, as our country faces severe energy, economic, environment and health challenges—all tied intimately to transportation—and as we now have proven advanced propulsion vehicles and alternative fuels capable of taking the place of those that met our needs in the last century, but are inadequate for our future, we have a historic opportunity to change course. Well-crafted financial incentives can be key to driving such change. Capturing this

opportunity can make the US a leader in the move to environmentally sustainable transportation and a model for other countries that look to us for example.

This concludes my prepared statement. I welcome your questions.

PREPARED STATEMENT OF JOSEPHINE S. COOPER

Mr. Chairman,

Thank you for the opportunity to testify before your Committee regarding energy policy issues. My name is Josephine S. Cooper and I am President and CEO of the Alliance of Automobile Manufacturers, a trade association of 13 car and light-truck manufacturers. Our member companies include BMW of North America, Inc., DaimlerChrysler Corporation, Fiat, Ford Motor Company, General Motors Corporation, Isuzu Motors of America, Mazda, Mitsubishi, Nissan North America, Porsche, Toyota Motor North America, Volkswagen of America, and Volvo.

Alliance member companies have more than 620,000 employees in the United States, with more than 250 manufacturing facilities in 35 states. Overall, a recent University of Michigan study found that the entire automobile industry creates more than 6.6 million direct and spin-off jobs in all 50 states and produces almost $243 billion in payroll compensation annually.

The Alliance supports efforts to create an effective energy policy based on broad, market-oriented principles. Policies that promote research development and deployment of advanced technologies and provide customer based incentives to accelerate demand of these advanced technologies set the foundation. This focus on bringing advanced technologies to market leverages the intense competition of the automobile manufacturers worldwide. Incentives will help consumers overcome the initial cost barriers of advanced technologies during early market introduction and increase demand, bringing more energy efficient vehicles into the marketplace.

This year, there has been increased attention on vehicles and their fuel economy levels with particular discussion of the Corporate Average Fuel Economy (CAFE) program. Rather than simply engage in an exercise updating a 26 year-old program with all of its flaws, Congress needs to consider new approaches for the 21st century. The Alliance and its 13 member companies believe that the best approach for improved fuel efficiency is to aggressively promote the development of advanced technologies—through cooperative, public/private research programs and competitive development—and incentives to help pull the technologies into the marketplace as rapidly as possible. We know that advanced technologies with the potential for major fuel economy gains are possible. As a nation, we need to get these technologies on the road as soon as possible in an effort to reach the national energy goals as fast and as efficiently as we can.

The Alliance is pleased that Vice President Cheney's National Energy Policy report recommends and supports a tax credit for advanced technology vehicles (ATVs). Specifically, it proposes a tax credit for consumers who purchase a new hybrid or fuel cell vehicle between 2002 and 2007. In addition, the report supported the broader use of alternative fuel and alternative vehicles. This is consistent with the Alliance's position of supporting enactment of tax credits for consumers to help offset the initial higher costs of advanced technology and alternative fuel vehicles until more advancements and greater volumes make them less expensive to produce and purchase.

In reviewing Senate legislation that has been crafted to spur the sale of advanced technology fuel-efficient vehicles, the Alliance is in general agreement with S. 760 introduced by Senator Hatch and others. Automakers would like to see some minor, technical changes made to the hybrid-electric vehicle section of the bill and would also support the inclusion of tax credits for advanced lean burn technology. The Alliance believes that the overall concepts and provisions found in S. 760 are the right approach and would benefit American consumers.

The bill would ensure that advanced technology is used to improve fuel economy. Performance incentives tied to improved fuel economy are incorporated into the legislation in order for a vehicle to be eligible for the tax credits. These performance incentives are added to a base credit that is provided for introducing the technologies into the marketplace.

Specifically, S. 760 has a number of important provisions addressing various types of advanced technologies. These include:

Fuel Cell Vehicles

The most promising long-term technology offers breakthrough fuel economy improvements, zero emissions and a shift away from petroleum-based fuels. A $4,000 base credit is included along with performance based fuel economy incentives of up

to an additional $4,000. The credit is available for 10 years to accelerate introduction—extremely low volume production is expected to begin in the 2005–2007 timeframe.

Hybrid Vehicles

Electronics that integrate electric drive with an internal combustion engine offer near term improvements in fuel economy. A credit of up to $1,000 for the amount of electric drive power is included along with up to $3,000 depending upon fuel economy performance. The credit is available for 6 years to accelerate consumer demand as these vehicles become available in the market and set the stage for sustainable growth. To be eligible for the credit, hybrid vehicles must meet or beat the average emission level for light duty vehicles.

Dedicated Alternative Fuel Vehicles

Vehicles capable of running solely on alternative fuels, such as natural gas, LPG, and LNG, promote energy diversity and significant emission reductions. A base credit of up to $2,500 is included with an additional $1,500 for vehicles certified to "Super Ultra Low Emission" standards (SULEV).

Battery Electric Vehicles

Vehicles that utilize stored energy from "plug-in" rechargeable batteries offer zero emissions. A base credit of $4,000 is included (similar to the fuel cell—both have full electric drive systems) and an incremental $2,000 is available for vehicles with extended range or payload capabilities.

Alternative Fuel Incentives

Alternative fuels such as natural gas, LNG, LPG, hydrogen, B100 (biomass) and methanol are primarily used in alternative fueled vehicles and fuel cell vehicles. To encourage the installation of distribution points to support these vehicle applications, a credit of $0.50 for every gallon of gas equivalent is provided to the retail distributor. This credit is available for 6 years and will support the distribution of these fuels as vehicle volume grows and may be passed on to the consumer by the retail outlet. Note that ethanol is not included in these provisions due to the existing ethanol credit.

Alternative Fuel Infrastructure

Complementary to the credit for the fuel itself, the existing $100,000 tax deduction for infrastructure is extended for 10 years and a credit for actual costs up to $30,000 for the installation cost of alternative fuel sites available to the public is included. One of the key hurdles to overcome in commercializing alternative fuel vehicles is the lack of fueling infrastructure. For nearly a century, infrastructure has focused primarily on gasoline and diesel products. These infrastructure and fuel incentives will help the distributors overcome the costs to establish the alternative fuel outlets and support distributors during initial lower sales volumes as the number of alternative fuel vehicles increases.

Automobile manufacturers believe that CAFE, however well-intended, has not achieved its desired goals and has had a number of unintended consequences. Meeting CAFE standards is not something that manufacturers can do by themselves. Because the standards are a sales-weighted fleet average, the ultimate outcome depends on what the consumer purchases. If not enough customers purchase the higher fuel economy models of a given manufacturer, then the fleet average for that automaker may not achieve the CAFE standard. Since manufacturers have widely varying fleet mixes and product offerings, the CAFE program has had widely disparate impacts on automakers and has afforded some manufacturers with significant competitive advantages at times.

Increasing CAFE standards will only exacerbate these problems. Higher standards may result in vehicles that are less attractive to customers in terms of meeting their needs for work and family. If consumer demand is not aligned with manufacturers production, there is the potential for significant negative impact on employment throughout the industry. Ultimately, any fuel savings that result will come at high cost to consumers, manufacturers and the economy. In short, automakers need to produce vehicles that appeal to customers. CAFE acts as a market intrusion that over time will create distortions and unintended adverse consequences.

Recent sales figures support this position. The top ten most fuel-efficient vehicles account for less than 2% of total sales. The ultimate goal for any business is to provide products consumers want to buy. Increasing CAFE standards will require automakers to produce less of the products that American consumers are actually purchasing today and more of the products that are in lower demand.

Fuel economy standards only address the supply side of the equation. The Alliance believes, however, that Congress does not need to set new standards or change the structure of the program as the law requires the Department of Transportation (DOT) to promulgate new light truck standards (pickups, SUVs, minivans and vans) at the maximum level taking into consideration certain criteria. Automakers will be working with the DOT to ensure appropriate standards are set.

In the industry, CAFE regulations affect each Alliance member differently. Manufacturers whose fleets are comprised primarily of larger, lower fuel economy vehicles are more constrained in their product planning by CAFE standards than manufacturers with fleets comprised mainly of smaller, higher fuel economy vehicles. As each manufacturer attempts to design, produce and sell vehicles in their target markets, CAFE operates, for some manufacturers, as a roadblock to supplying their vehicles to the market.

The domestic/non-domestic passenger car fleet distinction is another important matter. While originally designed to keep small car production in the U.S. and protect American jobs, this distinction has inhibited some manufacturers from increasing the procurement of U.S. parts and materials. The domestic/non-domestic distinction has had widely disparate impacts on automakers. The requirement for separate fleets serves as a clear example of CAFE's market distorting effects, which then have a negative impact on the U.S. economy.

Another consequence of CAFE has been the downsizing of the passenger car fleet. Weight and size reductions remain one of the prime means of achieving improved fuel efficiency. The basic laws of physics dictate that smaller, lighter vehicles fare worse in accidents than larger, heavier vehicles, all things being equal.

To reiterate, a better way to improve vehicle and fleet fuel economy, and one that is more in tune with consumer preferences, is to encourage the development and purchase of advanced technology vehicles (ATVs). Consumers are in the driver's seat and most independent surveys show that Americans place a high priority on performance, safety, space and other issues with fuel economy ranking much lower even with today's gas prices. ATVs hold great promise for increases in fuel efficiency without sacrificing the other vehicle attributes consumers desire. Just as important, the technology is transparent to the customer.

Member companies of the Alliance have invested billions of dollars in research and development of more fuel-efficient vehicles. Automobile companies around the globe have dedicated substantial resources to bringing cutting-edge technologies—electric, fuel cell, and hybrid electric vehicles as well as alternative fuel vehicles and powertrain improvements—to the marketplace. These investments will play a huge role in meeting our nation's energy and environmental goals.

These advanced technology vehicles are more expensive than their gasoline counterparts during early market introduction. As I mentioned earlier, the Alliance is supportive of Congressional legislation that would provide for personal and business end-user tax incentives for the purchase of advanced technology and alternative fuel vehicles. Make no mistake: across the board, tax credits will not completely cover the incremental costs of new advanced technology. However, it will make consumers more comfortable with accepting the technology and begin to change purchasing behavior. In short, tax credits will help bridge the gap towards winning broad acceptance among the public leading to greater volume and sales figures throughout the entire vehicle fleet. This type of incentive will help "jump start" market penetration and support broad energy efficiency and diversity goals.

Enabling consumers to make more effective fuel-efficient choices rather than mandating government standards makes more sense to achieve the desired outcome. After all, the industry already spends a significant amount on compliance with government regulations while investing large sums in capital improvements and competitive designs.

Some of the discussion today has centered on the vehicles of the automobile manufacturers. But it is important not to forget about a vital component for any vehicle—the fuel upon which it operates. As automakers looking at the competing regulatory challenges for our products—fuel efficiency, safety and emissions—and attempting to move forward with advanced technologies, we must have the best possible and cleanest fuels. EPA has begun to address gasoline quality but it needs to get even cleaner. This is important because gasoline will remain the prevalent fuel for years to come and may eventually be used for fuel cell technology.

Beyond gasoline, the auto industry is working with a variety of suppliers of alternative fuels. In fact, the industry already offers more than 25 vehicles powered by alternative fuels. More than 1 million of these vehicles are on the road today and more are coming. Today, we find vehicles that use:

- Natural gas, which reduces carbon monoxide emissions by 65 to 90 percent;

- Ethanol, which produces fewer organic and toxic emissions than gasoline with the longer term potential to substantially reduce greenhouse gases;
- Liquefied petroleum gas (propane), the most prevalent of the alternative fuels, which saves about 60% VOC emissions; and
- For the future, hydrogen, which has the potential to emit nearly zero pollutants.

The Alliance has submitted comments to the DOT in support of an extension of the dual fuel vehicle incentives through 2008. Current law provides CAFE credits—up to 1.2 mpg—for manufacturers that produce vehicles with dual fuel capability. These vehicles can operate on either gasoline or domestically produced alternative and renewable fuels, such as ethanol. However, the dual fuel credits end in model year 2004 unless extended via rulemaking by the National Highway Traffic Safety Administration. The Alliance believes an extension is important so that these vehicles continue to be produced in high volume to help encourage the expansion of the refueling infrastructure and giving consumers an alternative to gasoline.

In addition to alternative fuels, companies are constantly evaluating fuel-efficient technologies used in other countries to see if they can be made to comply with regulatory requirements in the United States. One such technology is diesel engines, using lean-burn technology, which have gained wide acceptance in Europe and other countries. Automakers have been developing a new generation of highly fuel-efficient clean diesel vehicles—using turbocharged direct injection engines—as a way to significantly increase fuel economy and reduce greenhouse gas emissions. However, their use in the U.S. must be enabled by significantly cleaner diesel fuel.

Earlier this year, EPA promulgated its heavy-duty diesel rule that the Alliance supports, as far as it goes. The rule reduces the amount of sulfur in the fuel. Low sulfur diesel fuel is necessary to enable the new clean diesel technology to be used in future cars and light trucks. Providing cleaner fuels, including lowering sulfur levels in gasoline **and** diesel fuel, will provide emission benefits in existing on-road vehicles. Sulfur contaminates emissions control equipment, such as catalytic converters. Efforts to reduce sulfur content will provide environmental benefits and allow vehicles to operate more efficiently. Unless there are assurances that fuels will be available, companies will not invest in new clean diesel technologies.

As you can tell, the automobile companies—from the top executives to the lab engineers—are constantly competing for the next breakthrough innovation. If I can leave one message with the Committee today, it is to stress that **all manufacturers** have advanced technology programs to improve vehicle fuel efficiency, lower emissions and increase motor vehicle safety. These are not "pie in the sky" concepts on a drawing board. In fact, many companies have advanced technology vehicles in the marketplace right now or have announced production plans for the near future. That's why now is the perfect time for the enactment of tax credits to help spur consumers to purchase these new vehicles which years of research and development have made possible.

Higher CAFE standards, with all of the disparate impacts inherent in that program, would divert limited resources from these ongoing efforts and distort the market for our products. Competition will drive improvements and success in the area of increasing vehicle fuel economy. This powerful market force should be allowed to work where it can and should be enhanced with incentives where they are needed to "prime the pump."

We would urge that public policy decisions focus on the steps that will achieve real improvements in fuel consumption and benefits our environment. We believe that advanced technology vehicles and appropriate tax policy are a better way to increase fuel efficiency than the policy of CAFE that effectively limits consumer choice, adversely affects safety and affordability and creates "winners and losers" within the auto community.

Thank you for the opportunity to testify before the Committee today. I would be happy to answer any questions you may have.

RESPONSE TO A QUESTION FROM SENATOR HATCH REGARDING FUEL CELL VEHICLES

Question: For fuel cell vehicles, extremely low volume production is expected to begin in the 2005–2007 timeframe. For these vehicles to become commercially viable may take 10–15 years, but, even then, these vehicles may still represent a small portion of the market. Consumer acceptance of this technology will play a large role in its success. Fundamental to this is the decision on how to fuel these vehicles—how to move to a hydrogen fueling infrastructure.

While significant improvements have been made in the size of fuel cell packs, costs are still high. The incentives in the CLEAR Act, a $4,000 base credit along with performance based fuel economy incentives of up to an additional $4,000, will provide a significant incentive for purchasers to take a chance on this new tech-

nology and bring these vehicles into the market. These credits will be critical to get consumers to take this chance. The credit is available for 10 years and will accelerate introduction.

PREPARED STATEMENT OF HON. MARK DAYTON

Mr. Chairman, Members of the Committee, thank you for the opportunity to testify before you today about tax incentives for alternative fuels. Minnesota is a leader in the production of renewable fuels such as ethanol, wind-generated electricity, biomass, and solar energy. Minnesotans have seen first-hand the vital role Federal and State tax incentives have played in developing these industries during their infancy, and I support legislation to extend and expand Federal tax incentives for ethanol, wind, biomass, and other renewable fuels.

Last month, Senator Tim Hutchinson and I introduced legislation to provide tax incentives for increased use of biodiesel, a renewable fuel made from soybean and other vegetable oils, that will reduce U.S. reliance on foreign oil; increase demand for farm products, thus boosting their market prices; and providing for a cleaner environment. It's a grand-slam home run!

Biodiesel is a home-grown, renewable fuel. Even as conventional fuel supplies are tightening, America's farmers are producing record crops of soybeans. Unfortunately, soybean prices are at 20 year lows. Building demand for biodiesel will help increase soybean prices while enhancing our nation's energy security.

As we increase demand for soybeans, we are investing in the economic well-being of farmers and rural communities across the country. Our legislation's goal is to expand markets for biodiesel from 20 million gallons to 200 million gallons annually. The U.S. Department of Agriculture estimates that such an increase in biodiesel sales will increase soybean prices by at least 25 cents per bushel.

Our legislation will result in higher prices for farmers, lower taxpayer subsidies, and will cause no reduction in federal highway trust fund revenues. Our bill provides federal excise tax credits of 3 cents per gallon for 2 percent biodiesel and 20 cents per gallon for 20 percent biodiesel to help make this infant industry cost-competitive. As demand for biodiesel increases and U.S. soybean prices rise, federal outlays under USDA's marketing assistance loan program will decline, resulting in substantial savings for American taxpayers. Our bill provides that a portion of those savings be used to reimburse the Federal Highway Trust Fund for any decrease in revenues.

In conclusion, this legislation is good for America's farmers, our rural economy, our energy security and the environment. I ask that you will incorporate it into any energy tax legislation reported out of this Committee.

PREPARED STATEMENT OF ROBERT DINNEEN

Mr. Chairman and Members of the Committee, I would like to thank you for the opportunity to provide comments on the important role that tax policy has in determining the nation's energy policies and priorities. For decades, tax policy and government subsidies promoted the development and use of petroleum products in transportation fuels. For example, while Henry Ford designed the Model-T to run on ethanol, taxes imposed on alcohol in the early '20s forced a change to gasoline, setting a course of dependency on imported oil that has had tremendous consequences for our economy, our environment and our national security.

The myopic focus on petroleum finally changed in the early '80s, when the Congress created a number of incentives to stimulate the production and use of various alternative fuels. One such fuel, ethanol, has become a critically important gasoline blending component, extending refining capacity, reducing pollution and providing an important economic stimulus to rural America. Thus, I am here to tell this Committee that the federal tax incentive program for ethanol fuels has been a tremendous success story, one that should be extended with modest changes to improve its application and expand its benefit.

The Renewable Fuels Association is the national trade association for the domestic ethanol industry, located in Washington, D.C. Our membership includes ethanol producers and suppliers, gasoline marketers, agricultural organizations and state agencies dedicated to the continued expansion and promotion of fuel ethanol. Today's domestic ethanol industry consists of 56 production facilities located in 20 states with an annual production capacity of 2.1 billion gallons. In 2000, the U.S. ethanol industry produced a record 1.6 billion gallons of high quality, clean burning

fuel ethanol. Production capacity continues to expand, particularly among farmer owned cooperatives, the fastest growing segment of our industry.

Background:

Ethanol is a clean, energy efficient, environmentally friendly fuel produced at production facilities that create jobs and economic opportunity for rural communities where they are located. Ethanol is an alcohol produced primarily from grain using a process almost as old as civilization itself. Today, however, ethanol production has come a long way from the wineries of ancient Greece or the stills of Prohibition. Fuel ethanol is produced on a mass scale utilizing millions of bushels of grain annually in a fermentation/distillation process. While the fundamentals of ethanol production have remained constant, the process technology has become quite sophisticated. There are now two general types of processing facilities, known as wet mills and dry mills that produce fuel-grade ethanol in the United States.

Wet mills are also commonly known as corn refineries. These facilities produce starch, ethanol and corn sweeteners, along with corn oil, corn gluten feed and corn gluten meal. Both corn gluten feed and meal are sold into the animal feed market. Dry mills use simpler technology to produce ethanol and distillers dried grains (DDG) that are also sold as a high-quality feed ingredient. So, one of the myths about ethanol production, that it is taking corn and wasting it to produce fuel, is immediately dismissed when you look at the array of products that come out of ethanol plants. Products for both human and animal consumption are co-produced with ethanol. Producing ethanol simply utilizes the relatively low-value starch in the grain while leaving behind vitamins, minerals, fiber, oil and protein to be utilized in higher-value markets.

Ethanol producers continue to improve efficiency. Modern technology makes it possible to build a state-of-the-art, cost-effective dry mill ethanol plant for about $1.15 per installed gallon of annual production. Most of the new ethanol production capacity consists of farmer-owned dry mills. Technological improvements throughout the industry have driven the cost of producing ethanol down dramatically. A 1986 report by the USDA Office of Energy predicted that the cost of producing ethanol in 1995 would be $2.11 per gallon. Instead, those costs were about $1.15 per gallon in 1995, and industry surveys now suggest that the average production cost is in the range of $0.95 to $1.10 per gallon.

Ethanol facilities are not only cost effective; they are energy efficient. A recent study by Argonne National Laboratory found that for every 100 BTUs of energy used to produce ethanol, 135 BTUs of ethanol are produced. That is because corn plants are really very efficient solar panels. USDA analysis has found that corn farmers use about half the energy to produce a bushel of corn than they did just 25 years ago. Therefore, the myth that it takes more energy to produce a gallon of ethanol than is contained in the ethanol itself is just that: a myth.

The Argonne report also provides an analysis of ethanol's greenhouse gas emissions compared to gasoline. Using ethanol produces 35–46 percent fewer emissions of greenhouse gases than gasoline for the same distance traveled. If engines are optimized to use ethanol, mileage will increase along with greenhouse gas benefits. Ethanol also reduces emissions of other harmful pollutants like carbon monoxide, and displaces components of gasoline that produce toxic emissions.

Ethanol Tax Incentive Program

Responding to the need for increased domestic energy resources, reduced air pollution from motor vehicles and rural economic stimulus, the Congress has consistently supported tax incentives to encourage the increased production and use of fuel ethanol. Today, refiners and gasoline marketers using 10% ethanol blends pay 13θ per gallon in excise taxes, a 5.3θ reduction from the tax paid on straight gasoline.

The federal ethanol program has been an unmitigated success. From just 175 million gallons in 1980, the industry has increased more than ten-fold to 2 billion gallons today. As a result, farmers across the country have received higher prices for their commodities, more than 200,000 jobs have been created in rural America, the U.S. has reduced its oil imports, and most importantly, Americans are breathing cleaner air.

Economic Benefits: The processing of grains for ethanol production provides an important value added market for farmers; helping to raise the value of commodities they produce. As the third largest use of corn behind feed and exports, ethanol production utilizes nearly seven percent of the U.S. corn crop, or over 600 million bushels of corn, adding $4.5 billion in farm revenue annually. The U.S. Department of Agriculture (USDA) has determined that ethanol production adds 25–30¢ to every bushel of corn.

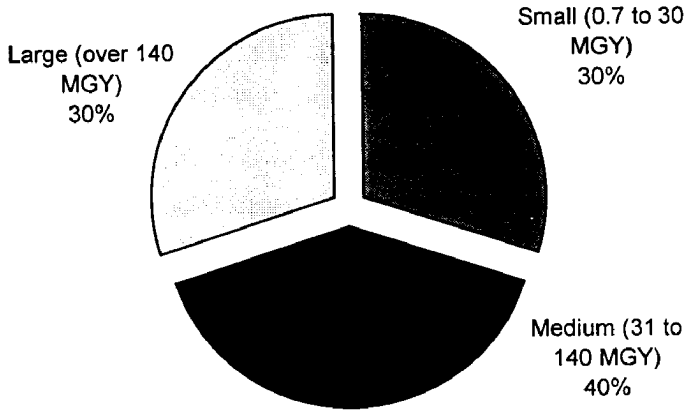
The production of ethanol has sparked new capital investment and economic development in rural communities across America. There has not been an oil refinery built in this country in 25 years. But during that time there have been 56 ethanol refineries built, stimulating rural economies and creating jobs. USDA estimates that a 100 million gallon ethanol production facility will create 2,250 local jobs for a single community.

Industry growth offers enormous potential for overall economic growth and additional employment in local communities throughout the country. According to a Midwestern Governors' Conference report, the economic impact of the demand for ethanol:

- Adds $4.5 billion to farm revenue annually
- Boosts total employment by 195,200 jobs
- Increases state tax receipts by $450 million
- Improves the U.S. balance of trade by $2 billion
- Results in $3.6 billion in net savings to the federal Treasury

The majority of growth in the industry in the last several years has been the result of farmer ownership of ethanol production facilities. These highly efficient dry mill plants typically go from the drawing board to production in less than two years. Today, farmer-owned cooperatives account for one-third of all U.S. fuel ethanol production. Cooperatives help to ensure farmer members a value-added market for their crops and offer profit sharing dividends as the industry prospers.

U.S. Ethanol Production Capacity



Continued progress is being made in the development of new enzymes and production processes that will allow for the cost-effective production of ethanol from cellulose. These feedstocks offer tremendous opportunities for new jobs and economic growth outside the traditional "grain belt," as well as additional environmental benefits through the reduction of greenhouse gases.

Environment & Public Health: Ethanol, a high-octane, high-value fuel, continues to be one of the best tools we have to fight pollution from vehicles. As an oxygenate (ethanol contains 35% oxygen), ethanol enables a more complete combustion of fuel. The use of ethanol reduces emissions of all the major pollutants regulated by the U.S. Environmental Protection Agency, including carbon monoxide, particulate matter, exhaust volatile organic compounds and hydrocarbons. Ethanol is also an effective tool for reducing air toxics in gasoline, many of which the EPA classifies as known or probable human carcinogens.

As a renewable fuel, ethanol can dramatically reduce greenhouse gas emissions, such as carbon dioxide, a contributor to global warming. Argonne National Laboratory concluded ethanol produced from Midwest corn reduces greenhouse gases by

35–46% compared with gasoline, and the number rises with cellulose ethanol production.

Ethanol is a safe, biodegradable fuel that does not pose an environmental or public health threat to water or soil, and has been awarded a "clean bill of health" by the California Environmental Policy Council.

Consumers Benefit: The availability of ethanol expands our fuel supplies, increasing competition in the marketplace and reducing overall gasoline prices paid by the driving public. As noted by the consumer group, Citizen Action, "the use of ethanol, a domestically-produced, cleaner-burning renewable fuel helps American consumers use less polluting oil and reduces dependence on costly oil imports."

The federal ethanol program encourages gasoline marketers and blenders to use ethanol by providing a tax reduction. As noted above, gasoline marketers and blenders that use ethanol are eligible for up to a 5.3 cent per gallon reduction from the federal excise tax on gasoline of 18.3 cents/gallon. The incentive, in turn, has enabled smaller, independent gasoline marketers to compete with the major international petroleum companies and provide consumers with an exceptionally cost-competitive fuel. Consider this statement by the Society of Independent Gasoline Marketers of America:

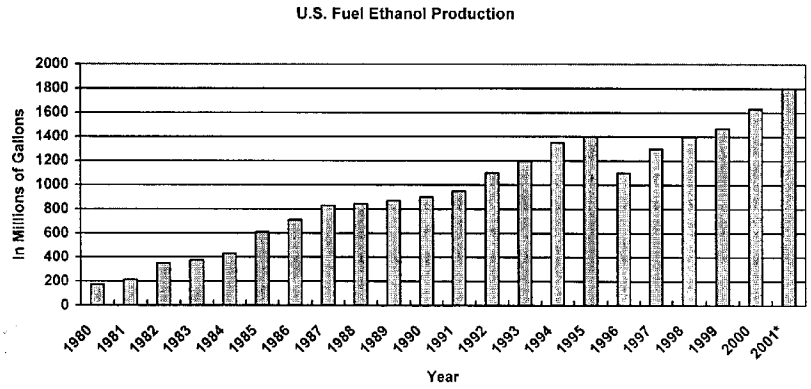
> "The tax benefits afforded ethanol-blended fuels constitute an important means by which independent marketers reduce their costs of product . . . enhancing independent marketers' ability to price compete with their economically more powerful, integrated competitors. Such price competition has consistently restrained retail market prices and thereby generated substantial benefits for consumers of gasoline."

Consumers benefit further because reduced farm program costs and increased income tax revenue attributable to the federal ethanol program provides a net savings to the U.S. Treasury of $3.6 billion a year. Indeed, for every dollar invested by the federal government to stimulate ethanol production and use, approximately $7 is returned to the treasury in tax revenue and savings from reduced government outlays.

Energy Security: The need for domestically produced energy supplies has never been greater. Today we are more reliant than ever before on foreign nations to supply our insatiable and growing appetite for oil, importing 54% of our petroleum. At the same time, U.S. oil production has fallen to the lowest point in 30 years. Furthermore, the continued high price of crude oil and lack of U.S. refining capacity exacerbate an already tight energy supply. The U.S. petroleum refining industry is operating at full capacity in an attempt to satisfy current demand, which continues to outpace supply. By importing more refined petroleum products than ever before, the U.S. is sending value-added refining jobs overseas. Meanwhile, demand for refined products will continue to grow.

According to the National Petrochemical & Refiners Association, "The U.S. is gravitating toward a situation in which demand for refined products is overtaking the capability of traditional supply sources. . . . With existing refining capacity essentially full, the U.S. will have to find additional sources to cover the incremental demand." As a domestic, renewable source of energy, ethanol can increase fuel supplies, reduce our dependence on foreign oil and increase the United States' ability to control its own security and economic future.

Ethanol can and should be a more consistent partner with domestic oil companies to provide the incremental additional supplies that are obviously needed. Ethanol is blended with gasoline after the refinery process. Therefore, blending ethanol adds additional volume to the transportation fuel market and helps ease the burden on a refinery sector that barely has the capacity to meet current demand and has no hope for quick expansion. The ethanol industry is producing at a record pace. In 2001 we will again shatter all previous production records. And the ethanol industry can double production within two years to meet new demand created by a phase out of MTBE. We are prepared to meet the challenge of providing increased fuel supplies—today.



The outlook for the ethanol industry is indeed bright, and the industry is expanding rapidly to meet new market demand for clean, renewable fuels. In addition to the over 2 billion gallons of current production capacity, 34 existing ethanol plants are undergoing expansion and eleven new plants are under construction. As a result, the ethanol industry expects to have an additional 300 million gallons of production capacity on line by the end of this year alone. In fact, a total of 3.5 billion gallons of production capacity will be available by the end of 2003.

Current and Future Annual Ethanol Industry Capacity

Current Ethanol Production Capacity:	2.1 billion gallons (56 plants)
On-going Expansions to Existing Plants:	235 million gallons (34 plants)
Plants Currently Under Construction:	210 million gallons (11 plants)
Approved Construction:	590 million gallons (16 plants)
Other Construction Scheduled for 2001/2002:	465 million gallons (25 plants)
Total Projected Ethanol Production Capacity by end of 2003:	3.0 billion gallons

Such rapid expansion in ethanol is necessary to meet the growing demand for alternatives to MTBE, a petroleum-based oxygenate that is contaminating drinking water supplies in many parts of the country. Whether by legislation, litigation or consumer preference, it is increasingly apparent that the future use of MTBE will be significantly curtailed. The ethanol industry is preparing to meet that increased demand so that air quality will not suffer as communities address their water quality concerns.

Moreover, as the Congress contemplates a comprehensive energy policy, it is clear that the demand for renewable fuels like ethanol will grow. Several bills have been introduced to create a national renewable fuel standard, requiring refiners to use an increasing level of alternative fuels.[1]

The Federal Ethanol Program is a Success and should be Extended: The importance of ethanol as an alternative fuel to the nation's economy has never been greater, and its value promises to grow even larger. Oil prices are again playing havoc with the American economy. The U.S. economy is facing the most significant period of sluggish growth in more than a decade and high oil prices are a major contributor to the current economic slowdown. Most major economic indicators have posted declines for at least three consecutive months; sales of autos and both new and existing houses are weakening; layoffs are mounting across a broad range of industries; corporate profit reports continue to disappoint the market; and many economic analysts are trimming their forecasts of real growth for 2001.

[1] See S.670, introduced by Senators Tom Daschle (D–SD) and Dick Lugar (R–IN), S. 1006, introduced by Senators Chuck Hagel (R–NE) and Tim Johnson (D–SD); and H.R. 2423, introduced by Representative John Thune (R–SD).

High oil prices increase the cost of doing business for virtually all firms and drain additional money from consumers' pocketbooks. The lack of a comprehensive energy policy in the U.S. has led to falling domestic production of petroleum and natural gas; near record levels of capacity utilization in refining; and increased dependency on imported oil, which has, in turn, placed American consumers more at risk to the arbitrary decisions of the world's oil exporters. Now is the time to re-double our efforts to promote the increased production and use of domestic, renewable fuels such as ethanol.

In recognition of ethanol's economic, environmental and energy security benefits, the national energy policy report released by the Administration last month included a recommendation to extend the ethanol tax incentive program. Senator Jean Carnahan (D–MO) has introduced S. 907 to extend the tax incentive program to 2015. As the U.S. ethanol industry continues to grow, many investors are looking for such a commitment on the part of the Congress before moving forward with certain projects. The incentive is currently set to expire in 2007. For a plant beginning construction next year, with production slated to begin in 2003, there will only be 4 years to recoup a sizeable investment. Now is absolutely the time for the Congress to extend the federal ethanol program, or make it permanent.

The Renewable Fuels Association strongly urges the Committee to consider extending the federal ethanol tax incentive program as it considers comprehensive energy policy legislation this year.

Small Producer Tax Credit

Under present law, a small ethanol producer (annual production capacity of 30,000,000 gallons or less) is eligible for an income tax credit of 10 cents per gallon on up to 15,000,000 gallons of alcohol production. While intended to stimulate expanded production, particularly by small farmer-owned facilities, the credit is not readily available to cooperatives or their patrons. Furthermore, for all small producers, the credit is subject to a number of limitations that reduce its benefit or limit its availability. Several bills[2] have been introduced, including S. 312, the Tax Empowerment and Relief for Farmers and Fishermen Act, by Senator Grassley that would address the current limitations of the small producer credit and make it more usable for farmer-owned cooperatives. Indeed, this provision has been approved by the Senate on three separate occasions, but never included in a final bill.

The Renewable Fuels Association enthusiastically supports the effort to address the small producer credit, and encourages the Committee to include this provision in legislation to be enacted this year.

Highway Trust Fund

The Transportation Equity Act for the 21st Century (TEA–21), Public Law 105–178, is the principal Federal legislation authorizing federal highway programs for the six-year period from FY1998–FY 2003. Enacted on June 9, 1998, TEA–21 provides significant new funding for highway programs, highway safety, and mass transit.

TEA–21 provides a record $218 billion for highway and transit programs. This represents a 40% increase over highway funds provided under the previous highway legislation, the Intermodal Surface Transportation Efficiency Act (ISTEA). TEA–21 also guaranteed that $162 billion generated by highway user fees would be spent on highway programs. Under TEA–21, 49 states have received record increases in highway funding.

In order to encourage the use of renewable fuels, Congress has provided blends of gasoline and ethanol a lower rate of tax than that imposed on gasoline. Since federal motor fuel taxes are a primary source of funding for highway programs, the issue has arisen as to the revenue impact of ethanol-blended fuels on Federal highway aid to States.

Although motor fuel containing ethanol does generate less revenue into the Highway Trust Fund, gasohol sales do not reduce funding for the majority of Highway-aid programs. This is because the funding states receive for these programs are based on criteria other than highway user fees from ethanol.

Funding for nine out of the eleven major highway apportionments are determined by statutory formulas of which ethanol tax receipts are not a factor. Two highway-aid programs, the Surface Transportation Program and Minimum Guarantee Program, are to some extent affected by a state's contributions to the Highway Account

[2] See also, H.R. 1999 by Congressman Jim Nussle (R–IA), H.R. 1636 by Congressman John Thune (R–SD), S. 907 by Senator Jean Carnahan (D–MO) and S. 613 by Senator Peter Fitzgerald (R–IL).

of the Highway Trust Fund. However, even for these categories, the amount of receipts or contributions a state pays into the Trust Fund does not exclusively determine the amount of funding received back from the Federal government.

Even with ethanol usage, highway revenues have increased beyond original projections, thus enabling increased funding for Federal-aid highway programs. The Revenue Aligned Budget Authority (RABA) has triggered an additional $1.5 billion in FY 2000 and $3.2 billion in FY 2001. An additional $4 billion in RABA funding is expected to be available in fiscal year 2002.

Gasohol's contribution to the Highway Account would be higher if all of the gasohol tax receipts remained in the Highway Account of the Trust Fund. However, for every gallon of gasoline blended with 10% ethanol, 5.46 cents of the 13.1 cent tax is diverted from the Highway Account, with 2.86 cents going to the Mass Transit Account, 0.1 cents going to the Leaking Underground Storage Tank Trust Fund, and 2.5 cents diverted to the General Fund for deficit reduction purposes. This diversion is resulting in more revenue being lost to the Highway Account than the total amount of the ethanol tax incentive itself.

> *The Renewable Fuels Association believes that states should not be penalized for acting on the federal government's desire to increase the production and use of ethanol. Thus, we support transferring the 2.5¢ currently directed toward deficit reduction back to the Highway Trust Fund.*

Conclusion

Congress has enabled the domestic renewable fuels industry to develop by supporting tax policies that encourage refiners and gasoline marketers to utilize ethanol. The program has been a tremendous success. It has provided an economic stimulus to rural America, created jobs, reduced our dependence on imported energy and improved our balance of trade, and lowered auto emissions in our nation's cities. The program should be extended to encourage additional investment and growth. But the program should also be altered to allow farmer-owned cooperatives to more effectively access the small producer incentives, and concerns about the impact of reduced HTF payments attributable to ethanol fuels should be addressed.

Thank you.

PREPARED STATEMENT OF JAY E. HAKES

Thank you for the opportunity to discuss the role of tax incentives in U.S. energy policy. This testimony discusses how tax incentives fit into an overall energy strategy, identifies some results of previous incentives, and provides a checklist of major issues affecting new tax policies for energy.

From 1993 to 2000, I headed the Energy Information Administration at the U.S. Department of Energy. At that time, I testified on many occasions before congressional committees on energy issues, including tax policies. Today, I am speaking as a private individual and certainly not on behalf of any past or current employers.

CURRENT GENERAL ENERGY POLICY

The major leg of our nation's energy strategy is allowing fuel selection, allocation, and pricing to be determined in competitive markets. This policy evolved in reaction to counterproductive attempts by the U.S. government to control the pricing and allocation of oil and gas during the 1970's and as part of a general trend around the world to less regulated markets. Utilization of market forces has been a corner stone of our energy policy with bipartisan support. President Carter and the Congress started the painful process of decontrolling oil prices in the late 1970's. President Reagan accelerated and expanded the effort. In recent years, changes in state and federal policy have expanded the role of markets in the electric industry.

Using the market to make decisions about energy doesn't, in many respects, look like a policy, because government plays a reduced role. In a pure market system, government doesn't set prices or pick "winners and losers." Despite a general commitment to market forces, however, many people ranging from energy producers to energy consumers still want the government to "do something" when prices get unusually low or unusually high or to show preferential treatment for a particular industry or technology.

As a second leg of energy policy, the U.S. sets environmental standards for energy producers and consumers. Most notably, stringent air pollution standards govern the activities of electric generators, automobiles, and oil refineries. Another part of the current energy policy includes restrictions on the areas where exploration and production of fuel are allowed in order to protect natural areas.

The energy crises of the 70's also stimulated several auxiliary policies, including the

- Strategic Petroleum Reserve,
- Research and development for new technologies,
- Efficiency standards for cars and appliances,
- Low-Income Energy Assistance,
- Weatherization of low-income housing,
- Better data systems to track energy trends, and
- Tax incentives.

The rationale for these programs was often based on considerations of national security, the environment; education of the public and disproportionate impacts of high prices on low-income people—factors often not fully reflected in market pricing. All of these policies continue in some form today, but have fallen short of their authors' goals. When energy appeared to be less of a problem over the past two decades, support for all of these auxiliary programs lagged.

In general, U.S. energy policy has worked well. Most of the time, U.S. prices are low by international and historic standards. Supplies have generally been ample. Many advocates now seem to assume the country suffers from chronic high fuel prices. The record suggests the opposite, however, witness the oversupply of oil and gas just a few years ago. With existing U.S. energy policy, we have also reduced the environmental Impacts from energy. Not every deadline of the Clean Air Acts has been met. Nonetheless, we removed lead from gasoline and reduced many forms of air pollution. Oil tankers are now double-hulled. These achievements have had costs but generally proven compatible with a low price environment.

PROBLEMS IN CURRENT ENERGY POLICY

To say that existing energy policy works most of the time is not to say it works all of the time or in every respect. Attempts to improve U.S. policy must be based on clear diagnoses of what problems need attention. Three major shortcomings in current U.S. energy policy stand out.

Oil Imports

There are several ways to measure dependence on foreign oil. The U.S. imports over half its oil from foreign sources, and these levels are projected to reach 60 percent in the coming years. Imports were roughly a third of oil supplied when the 1973 oil embargo crippled our national economy. From this perspective, current and projected levels of imports are clearly serious issues, but major reductions in the levels of imports would still leave us vulnerable to the vagaries of the international oil market. If a goal of American energy policy has been to stop the growth in oil imports or achieve "energy independence," that goal has clearly not been achieved. Moreover, it would be extremely expensive to make a serious attempt to achieve it.

Oil imports are not exactly the same thing as vulnerability to supply interruptions, although the two are closely related. Increased U.S. oil production and reduced oil demand from more efficient automobiles would limit the economic damage from a cut off in delivery of foreign oil. However, neither would provide would provide the tools to rebalance oil markets quickly in the event of an unexpected interruption of supply. Rapid response to an interruption in oil supply is more likely to come from a petroleum reserve, some other source of "surge capacity," or the ability to make a sharp but temporary cut in demand.

Global Climate Change

Pursuant to the Rio Treaty of 1992, the United States adopted a policy of attempting to limit emissions of greenhouse gases—most of which come from energy use—to 1990 levels. The Treaty and the Energy Policy Act of 1992 attempted to meet this goal through voluntary actions. This approach has produced some results but has generally failed to stem the growth in U.S. emissions, which actually accelerated in the 1990's. Based on current policies and economic trends, the Energy Information Administration projects emission levels in 2010 will be about 30 percent higher than in 1990. If the U.S. electricity demand justifies 1,900 new electric plants by 2020 rather than the 1,300 projected by EIA, the growth in greenhouse gases will also be substantially higher than EIA estimates. Current U.S. energy policy does not attach a cost to the emission of greenhouse gases.

Price Volatility

In 1998, energy users enjoyed oil and gas prices well below the expected norm. Unfortunately for consumers, those low prices planted the seeds for today's high prices. In response to low prices,

- Some small producers found it uneconomic to continue operations,

- Drilling for new supplies of oil and gas slowed significantly across the world,
- An increasingly disciplined Organization of Petroleum Exporting Countries cut back on production to force prices to higher levels, and
- Economic incentives to use energy efficiently were reduced.

Together, these trends led from conditions of over supply (a buyer's market) to under supply (a seller's market) in world and domestic markets.

Recent high prices have already led to some market corrections and could even lead to a sharp fall in prices at some future point. Natural gas markets have produced the most striking signs of turnaround. American consumers and producers have substantial experience over the years with wild swings in oil prices. Such volatility is like to become more evident for natural gas and electricity, as those industries become less regulated.

Volatility in energy costs has serious ramifications. Small producers on thin margins find it difficult to secure financing to get through the rocky periods of low prices. On the other side, consumers can't budget accurately for energy costs during price spikes. During periods of high prices and low inventories, energy markets can be thrown into turmoil by otherwise solvable problems like breakdowns in refineries or transportation systems. Californians faced interruptions in electric service when national gas prices soared nationally, pipeline problems further aggravated gas supplies for the state, reduced precipitation limited supplies of hydropower, and a regulatory scheme allowed wholesale prices to exceed retail prices.

Although prices fluctuate greatly for most commodities, cyclical swings can be more serious for energy. Energy users have limited options for short-term substitutions. That is, if oil prices jump, motorists can't suddenly put coal in their tanks. Most energy producers cannot bring on new supply quickly, given the lag times between investments, drilling, and production. Moreover, it's reasonable to suspect than growing affluence increases the severity of price swings. As personal disposable incomes rise, it likely takes larger price signals to trigger a demand response to low supplies of energy. Addressing these problems could involve providing incentives for counter cyclical behavior in energy markets.

New initiatives in energy policy should focus on dealing with identified weaknesses in current policy. These would include continued vulnerability to interruptions in foreign oil supplies, lack of progress in limiting emissions of greenhouse gases, and wild swings in energy inventories and prices. In creating or adapting energy policies, care should be taken to avoid cures that are worse than the disease.

ROLE OF TAX INCENTIVES

Tax incentives have been part of previous energy programs, and the current energy debate has produced proposals for many new ones. Given the difficulties of forecasting, it's often difficult to know in advance what the actual impacts of these proposals would be in the market.

One way of evaluating such proposals is to use government modeling systems, such as those found at the Treasury Department and the Department of Energy's Energy Information Administration (EIA). There is an ample public record of EIA's analyses of previous tax proposals. Moreover, EIA can do special studies at the request of congressional committees. While economic models have many limitations, they can provide better guidance than speculation or the pleadings of advocates.

Another way of looking at tax proposals is to examine the historical record of energy tax incentives. Since the energy crises of the 1970's, the Congress has established numerous tax incentives for energy supply and consumption. The track record of these efforts provides some guidance on how future incentives might work.

Over time, many tax incentives have had little or no impact on energy markets. In most cases, the economic and technical forces at work in the energy system have too much momentum to be influenced greatly by government tax incentives, unless the latter are particularly large or well designed.

Several tax incentive programs, however, have had clear impacts. Examples include:

- U.S. reserves of coal-bed methane roughly tripled from 1989 to 1999, by which time these reserves accounted for 8 percent of all U.S. dry natural gas reserves. The Alternative Fuel Production Credit applied to a number of "nonconventional" fuels. Coal-bed methane, however, has been the major beneficiary of the program, has helped the U.S. meet rising demand for gas, and stands as a major example of a successful incentive program.
- The Federal tax code contains four overlapping tax incentives for the use of ethanol as transportation fuel, including its use as a blending fuel in gasohol. With the help of these incentives and various other state and federal policies, U.S. ethanol production, with corn as the primary feedstock, reached 1.5 billion gal-

lons in 1999. Even at this level of production, ethanol constitutes only about 1 percent of U.S. consumption of transportation fuels.

- The Deep Water Royalty Relief Act (1995) provided incentives for exploration and development of the deep waters of the Gulf of Mexico. After the start of the royalty relief program, leasing in the deepwater Gulf increased dramatically, more than tripling between 1995 and 1997. It is less clear whether this effort helped slow the overall decline in domestic production somewhat or simply attracted oil investments away from other projects.

Others examples could be given of tax incentives that have made a difference in energy markets and those than haven't. On the whole, tax incentives have not been a dominant force in U.S. energy policy, but they have had some influence.

USING INCENTIVES TO SPUR NEW TECHNOLOGY

An argument often made is that tax incentives are needed to promote new technologies with promise but unable to compete against established technologies. A review of the historical record and modeling exercises suggest a number of issues that should be kept in mind during debates about specific tax proposals.

Cost. The costs of tax incentive programs can be significant, out of necessity to achieve the objective or because of poor planning. The $1 billion Alternative Fuel Production Credit was the largest energy-related tax credit in 1999 on an outlay equivalent basis. This tax expenditure reached that level because the credit was utilized to build a strong coal-bed methane industry. Costs can sometimes exceed estimates, as illustrated by Arizona's 30 percent rebate of the purchase price of a vehicle that could run on alternative fuel. Passed in April of last year with an estimated price tag of $3 million to $10 million, costs grew to about $600 million by November, when the state stopped the program.

U.S. energy systems constitute a large part of the national economy and generally cannot be changed with small programs. Trying to deal with major energy issues like oil imports or emissions of greenhouse gases with tax incentives would be very expensive indeed.

Designing programs with low costs has different hazards. Low costs often result, because people don't find incentives sufficient to change behavior, leaving them unutilized. In these cases, programs have little impact. In recent years, most proposals for tax incentives have been modest compared to, for instance, the solar tax credit of 40 percent in place from 1978 to 1985.

Duration. To limit budget impacts in out years, it has become popular to propose tax incentives that are temporary. The periods specified are often unrealistically short. For many new technologies, it takes several years to make new products available to take advantage of new tax programs. By the time suppliers and consumers are prepared to deal with the new program, it may be reaching its scheduled termination. Legislators may intend to extend incentives, but this intent may not be sufficient for those who finance projects.

Free Riders. Analysis of previous proposals suggests some incentives wouldn't be sufficient to stimulate many new purchases of energy efficient equipment. They would, however, provide substantial payments to people who would have bought the equipment anyway. This happens most frequently when certain states already mandate alternative fuels for electric generation or transportation. The major impact of such "incentives" is to pay people for what they are going to do anyway.

Credibility. The Tax Reform Act of 1986 and occasional delays in renewing tax incentives has undermined the credibility of federal attempts to change energy markets with tax policy, since that policy is always subject to change. Introducing new energy technologies involves large and sustained capital investments. Since the reliability of the federal government's retaining announced incentives remains in question, long-term investments based on tax policy will always carry extra risk.

Market Readiness. The success of tax incentives depends how close the new technologies are to being market ready, a judgment on which experts often differ. As the coal-bed methane story shows, sometimes, markets are ripe for taking a new direction. However, many other technologies have not met the optimistic estimates of their advocates. On the other hand, technologies that are "too ready" can create free riders or the runaway Arizona program for alternative fuels.

Picking Winners and Losers. Some people argue that once the government has set environmental and other parameters, it shouldn't try to select the winning and losing technologies. Others argue that certain technologies have special strategic importance or potential and deserve extra support.

Complexity. Incentives aimed at individual consumers may suffer from the difficulty of becoming aware of what's available and making the calculations to claim them. There can also be ambiguities about whether new technologies are covered

under previously passed legislation. As a result, many incentives need periodic updating and public education programs to be clear and effective.

Relevance. Some burden of proof could apply to proposed tax incentives for energy to show they'd likely help alleviate the problems not well addressed by current energy policy—dependence on foreign oil, greenhouse gas emissions, or price volatility for oil, gas, and electricity. It is difficult, for instance, to see much connection between many proposed tax incentives and efforts to reduce the volatility of energy prices—the direct reason for most of the current energy discussion. One exception may be the proposal to base Section 613A language for small refineries on average production rather than production on a single day. Putting a single day cap on refineries would seem to discourage the surge production needed when supplies are tight.

TAX INCENTIVES FOR FUEL CELL AND HYBRID VEHICLES?

The Administration's energy strategy released in May contained a proposal to provide temporary income tax credits for the purchase of new hybrid or fuel-cell vehicles, one of the major specific proposals for reducing energy demand. In the absence of a comprehensive analysis of all the incentives proposed, a look at this one shows some of the potential and the hazards in using tax incentives to achieve the goals of energy policy.

Vehicles powered by fuel cells are unlikely to become available in significant numbers soon enough to take advantage of this proposal. However, electric-hybrid cars obtaining power from batteries and small internal combustion engines have already entered the market. Honda and Toyota are currently selling hybrids called Insight and Prius. Unlike all-electric cars, hybrids are easily used within the current energy Infrastructure, because they don't need external recharging. With efficiency gains from advances like regenerative braking, they have ranges between fueling far exceeding those of traditional cars and combine substantial fuel savings with good performance. This appears to be an areawhere tax incentives could accelerate penetration of an emerging technology and help meet strategic and environmental goals by reducing the consumption of gasoline.

The Bush proposal is similar to one initiated by President Clinton in his 1999 Climate Change Technology Initiative in 1999 and modified in his budget submission for FY2001. In April of 1999, I testified before the House Science Subcommittee on Energy and Environment on likely impacts of the first version of the Initiative. At the request of the House Committee on Government Reform, EIA analyzed the revised proposal in a report released in April of 2000. This previous work by EIA furnishes some existing estimates on possible impacts of several proposals for tax incentives for energy technologies, including those for hybrid cars.

In its April, 2000 report, EIA estimated that with the tax incentives the sale of hybrid vehicles would reach 315,000 by 2005, as opposed to 239,000 without the credits. In 2010 (by which time the credits would have terminated), sales would reach 768,000, compared to 627,000 in the base case. Acknowledging that such projections are only estimates, it still seems clear that such incentives would encourage the purchase of some additional hybrid vehicles and, because of the detailed specifications in the proposal, would probably encourage the fleet of hybrids to be even more fuel efficient. However, benefits would also go to cars that would have come on the market anyway, and the overall impacts on the total consumption of gasoline would be modest.

Why isn't there a bigger effect on consumer decisions?

- First, current makers of hybrids sell them a sizeable loss, which masks the fact they cost substantially more to make than equivalent traditional vehicles. Even though the cost differences will narrow over time, the incentives provided in the package analyzed by EIA were probably not big or long enough to have a great impact on consumer choice.
- Second, although hybrids can in most respects equal and in some cases exceed the performance of traditional vehicles, they also require some compromises, such as the need to find space for the battery.
- Third, the vehicle fleet turns over slowly, so it takes a sustained effort over a substantial period to affect the characteristics of the overall stock of vehicles.

There is perhaps a bigger concern than any discussed in the EIA report—unintended consequences if manufacturers continue to use the Corporate Average Fuel Efficiency (CAFE) standards as a ceiling as well as a floor. If manufacturers offset increased sales of highmileage hybrids with sales of low-mileage vehicles, they can continue meeting current mileage standards for new car sales. As a result, the net impact of hybrids on reducing the consumption of gasoline is unknown and could prove minimal. Historical precedents suggest this concern may be well founded. During the 1990's, a number of advanced technologies, including advanced aero-

dynamics and four-valve per cylinder engines, made new vehicle fleets more efficient. Yet average vehicle mileage did not improve, because efficiencies were used to increase vehicle weight and acceleration, not to improve fuel consumption.

If the intent of the vehicle tax credits is to reduce dependence on foreign oil or cut back on the growth in greenhouse gas emissions, the results could be limited and the "free riders" could be numerous. Such credits may be more effective as a way of helping manufacturers meet higher mileage standards resulting from an updating of CAFE than as a stand-alone policy.

The EIA report also covers proposed tax incentives for energy-efficient building equipment, energy-efficient new homes, rooftop solar equipment, distributed power property and renewable electricity generation. This analysis should be considered in the Committee's current deliberations, with the understanding that all forecasts are subject to revision and that proposals with different levels and durations would produce different results.

SUMMARY

It is always difficult to project the future impacts of proposed tax incentives for energy. If the guidance of history and various energy models is correct, some will have the desired effects, and many will not. As proposals come forward, it's important to subject all of them to vigorous analysis, no matter how good they sound, and to examine how they relate to other strategies that might be adopted. Such an effort increases chances for success and reduces the likelihood of unintended consequences.

Jay E. Hakes served as Administrator of the Energy Information Administration, the independent data and analytic arm of the U.S. Department of Energy, from 1993 to 2000. During that period, he oversaw the develop of EIA's award-winning web site and the publication of major studies ranging from long-term oil reserves to the costs of limiting emissions of greenhouse gases. He has testified before congressional committees on energy issues on over 25 occasions and has briefed major officials throughout the U.S. government and around the world. He holds a Ph.D. from Duke University and currently serves as the Director of the Jimmy Carter Presidential Library in Atlanta, Georgia. From 1980 to 1993, he held a number of positions with Florida Governor and later U.S. Senator Bob Graham.

PREPARED STATEMENT OF DAVID S. HALL

Mr. Chairman, members of the committee, I am David S. Hall, Manager of Taxation for Berry Petroleum Company (an independent heavy oil producer since 1909), of Taft, California, and Chairman of California Independent Petroleum Association's (CIPA) Economic and Policy and Taxation Committee. I am also a member of the Tax Committee of the Independent Petroleum Association of America (IPAA). This testimony is submitted on behalf of the IPAA, the National Stripper Well Association (NSWA), and 33 cooperating state and regional oil and gas associations. These organizations represent independent petroleum and gas producers, the segment of the industry that is damaged the most when domestic energy policy does not recognize the importance of our own national resources. NSWA represents the small business operators in the petroleum and natural gas industry, producers with "stripper" or marginal wells.

Today's hearing addresses the role of tax incentives in energy policy. I have attempted to answer your challenge by examining a critical issue confronting domestic petroleum and natural gas production—the role of the tax code with regard to the enhancement or deterioration of domestic exploration and production of natural gas and crude oil. To put this issue in a clear perspective all we have to do is look to the 1999 National Petroleum Council (NPC) *Natural Gas* study and the 1994 NPC *Marginal Wells* study. The 1999 study concluded that U.S. demand for natural gas would increase by over 30 percent during the next ten years. It also identified four general areas that must be addressed to assure that this clean burning fuel will be adequately supplied to America's consumers. These are: access to capital, access to the national resource base, access to technology, and access to human resources. The federal government is a significant—if not pivotal—factor in two of them: access to the resource base and access to capital. The federal tax code plays an integral part in providing access to the capital essential to develop domestic resources—both natural gas and crude oil.

Federal tax policy has historically played a substantial role in developing America's natural gas and crude oil. Early on, after the creation of the federal income tax, the treatment of costs associated with the exploration and development of this critical national resource helped attract capital and retain it in this inherently cap-

ital intensive and risky business. Allowing the expensing of geological and geophysical costs and percentage depletion rates of 27.5 percent are examples of such policy decisions that resulted in the United States' extensive development of its petroleum.

But, the converse is equally true. By 1969, the depletion rate was reduced and later eliminated for all producers except independents. However, even for independents, the rate was dropped to 15 percent and allowed for only the first 1,000 barrels per day of crude oil (or equivalent natural gas) produced. A higher rate is allowed for marginal wells, which increases as the crude oil price drops, but even this is constrained—*in the underlying code*—by net income limitations and net taxable income limits. In the Windfall Profits Tax, federal tax policy extracted some $44 billion from the industry that could have otherwise been invested in more production. Then, in 1986 as the industry was trying to recover from the last long petroleum price drop before the 1998–99 crisis, federal tax policy was changed to create the Alternative Minimum Tax that sucked millions more dollars from the exploration and production of crude oil and natural gas. These changes have discouraged capital from flowing toward this industry. And, without capital the ultimate result is lower production. Since 1986, domestic crude oil production has dropped by over 2.5 million barrels per day.

Now, independent producers are recovering from the low prices of 1998–99 that starved the industry of funds to maintain existing production and to explore and generate new production—production of both crude oil and natural gas. And in California this has been further complicated by the energy crisis. Today, we look at a world where petroleum production is perilously close to petroleum demand. In late 2000 essentially all countries except Saudi Arabia were production at full capacity. Later this year as seasonal demand increases, we could well return to a similar situation. Today, we look at natural gas and crude oil supplies struggling to meet demand in the United States primarily because of the loss of capital when crude oil prices fell. Today, we have a domestic industry ready to find and produce energy for the nation's consumers, but this inherently risky industry must compete for funds against other more appealing investments and the lure of lower costs to produce foreign oil.

Hearings throughout Congress have echoed with the statements of members from producing and consuming states alike that more must be done to increase domestic production. The question is how. Much of that answer lies within this Committee.

Near Term Actions

In the near term there are a number of actions that can be taken. In fact, there has been wide agreement on these actions between Republicans and Democrats. Numerous bills have been introduced in the House and Senate with substantial sponsorship during the 106th Congress and now in the 107th Congress. In the House, H.R. 805 has been introduced with a number of exploration and production provisions and in the Senate S. 389 introduced by Senator Murkowski and S. 596 introduced by Senator Bingaman both include a tax title with key provisions.

First, action should be taken to clearly allow expensing of geological and geophysical costs and of delay rental payments. Congress has passed these changes. These changes would clearly aid the development of new wells and they reflect historic practice in treating these costs. (IPAA Fact Sheets detailing these issues follow this testimony.)

Second, there is wide support for a countercyclical marginal well tax credit. This approach was recommended by the National Petroleum Council in its 1994 *Marginal Wells* study. This tax credit today can be crafted with a negligible impact on the federal budget, but at the same time create an important safety net for the most vulnerable American producing wells—wells that produce petroleum roughly equivalent to imports from Saudi Arabia—wells that are the nation's true strategic petroleum reserve. For example, California heavy oil is price less than WTI and costs more to extract. Therefore, California heavy oil is especially harder hit when oil prices drop. (An IPAA Fact Sheet detailing this issue follows this testimony.)

Third, Congress has suspended the property taxable income limitation on percentage depletion for marginal wells through 2001. The tax bill passed by the 106th Congress would have suspended this provision through 2004. The suspension that was in place in 1998 and 1999 saved many marginal wells during the price crisis. This provision should be permanently eliminated to provide domestic producers of these wells an incentive not to plug the wells during a low price cycle. Once the well is plugged, the potential to produce the remaining reserves is lost forever. (An IPAA Fact Sheet detailing this issue follows this testimony.)

Fourth, the 106th Congress' tax bill would have also suspended through 2004 the 65 percent net overall taxable income limit on percentage depletion. This constraint

on independent producers limits the amount of capital that can be retained for reinvestment into existing and new production. In an industry that typically reinvests 100 percent of its profits back into the industry, this constraint means less domestic crude oil and natural gas. It too should be eliminated. (An IPAA Fact Sheet detailing this issue follows this testimony.)

The number of independent producers qualifying for percentage depletion has decreased. Percentage depletion has been further limited as a result of mergers and acquisition of the various producers as they seek ways of reducing their costs, consolidating production fields, and operating more efficiently. However, percentage depletion remains very important to the small producer with marginal well production. Limiting the number of barrels qualifying for percentage depletion and artificially lowering the rate in a declining industry is counterproductive. Increasing the number of barrels qualifying and/or increasing the depletion rate would go a long ways to help the small independent when prices are low. Additionally, the smaller refiner exception to oil depletion deduction should be changed to average daily refinery runs from its present daily run.

Fifth, the 106th Congress' tax bill extended the net operating loss carryback period for independent producers to five years. This approach or one that would allow for the carryback of carried over percentage depletion that was limited by the 65 percent net taxable income limit both have been introduced in the 107th Congress. Taken together with the changes passed regarding percentage depletion, millions of dollars would be made available based on costs and losses already incurred to enhance domestic production.

Collectively, these provisions have wide support. They would be of significant national value. They should be enacted now. Equally important, they must be crafted in such a manner to assure that the Alternative Minimum Tax does not nullify the benefits that they would create. The mistake of 1986 should not be repeated. When the industry is in desperate need of capital, it should not be stripped away.

Next Steps

For the future, the country needs to look toward tax policies to encourage domestic production of its crude oil and natural gas. The AMT remains a constriction. While the AMT was modified to exclude percentage depletion from the calculation of the alternative minimum taxable income (AMTI), independent producers remain subject to the AMT with regard to intangible drilling costs (IDCs). Specifically, if "excess intangible drilling costs" exceed 65 percent of net income from all oil and gas production, these costs are "potential preference items". AMTI cannot be reduced by more than 40 percent of the AMTI that would otherwise be determined if the producer was subject to the IDC preference. This 40 percent rule forces some independent producers—particularly smaller ones—to curtail drilling once the expenditures become subject to the AMT. Now is a time when drilling needs to increase significantly. The 1999 NPC *Natural Gas* study estimates that the number of wells drilled needs to double over the next fifteen years. Independent producers drill 85 percent of domestic oil and gas wells. It makes no sense for the federal tax code to be a barrier to this effort.

Some of the future focus also needs to be directed to getting more out of existing resources. For example, it is clear that the Enhanced Oil Recovery tax credit has added millions of barrels of crude oil production and continues to assist in recovering the economically higher-cost significant heavy oil reserves using technologies that have been proved to work for more than twenty years. This provision should be reviewed with the intent of examining and adding appropriate EOR methods as qualified methods. (An IPAA Fact Sheet detailing this issue follows this testimony.)

Equally significant, policies need to address encouraging more new development. Proposals to encourage domestic exploration and production should be created. A number of concepts are already in play and need to be more fully evaluated.

For example, the Section 29 tax credit for unconventional fuels proved to be a strong inducement to developing those resources. It applies to wells drilled prior to 1993 and uphole completion thereafter. Just last July, the Federal Energy Regulatory Commission acted to reinstate its certification process to address many wells that would otherwise qualify for the Section 29 tax credit. But, the existing credit expires in 2003 and provides no incentive for current development since the qualifying wells had to have been drilled before 1993. The extension of this credit is essential for some California oil producers to continue to develop this resource. S. 389 extends the existing credit and creates a second drilling window that also applies to heavy oil. In early May, Steve Williams, President of Petroleum Development Corporation in Bridgeport, West Virginia—and a member of IPAA's Tax Committee—testified before the House Ways and Means Committee regarding Section

29. His testimony included several recommendations regarding Section 29 and IPAA commends that testimony for your consideration.

Fundamentally, the question facing the nation is how to marshal the capital to develop its domestic resources. The 1999 NPC *Natural Gas* study estimates that an additional $10 billion over and above the current expenditure level will need to be invested annually in domestic production over the next fifteen years to meet the expected demand. This investment is essential to provide for the supply increase of approximately 30 percent over this time period. So far, this target does not appear to have been met. The NPC study was based on 1998 actual information. From 1998 through 2000, domestic natural gas production has increased by about two percent—an average one percent per year—roughly half the amount needed. Some of this limitation reflects the consequences of the 1998–99 oil price crisis as it played out in natural gas development. Now, natural gas drilling rigs are at record levels constrained in part because of rig availability. The success of this activity is showing up in increased natural gas reserves, but it is important to recognize that—over the past five years—domestic natural gas reserve replacement has essentially stayed even. To meet future demand increases reserves must grow appreciably. Moreover, in recent years the depletion rate for domestic production has increased substantially to now average 24 percent per year—with some significant Gulf of Mexico fields depleting at rates exceeding 40 percent per year. New production must not only overcome this depletion, it must grow in absolute terms.

With regard to domestic oil production, the challenge is to maintain existing production levels to (1) reduce foreign dependence and (2) to assure the existence of a healthy domestic exploration and production industry. For example, while natural gas drilling rig counts are at record rates, domestic oil rig counts are essentially half of their 1997 level. Heavy oil production and development budgers in California has been drastically cut as the result of: (1) record high Southern California border natural gas prices, (2) the California utilities cash-flow problems including a bankruptcy, and (3) the non-payment to some qualified facilities (QF's) that produce electricity for sale. The sale of electricity offsets the cost of the co-generation steam, which is injected into the reservoir and is critical for heavy oil production. At issue, then, is how to obtain the continuing capital essential for domestic development. One source is the capital markets and some of this amount will come from there, but it has significant drawbacks. First, the capital markets have yet to show a strong interest in the oil and gas exploration and production industry despite the recent high prices of both commodities. Second, where the capital markets are likely to focus their attention will be on large companies. So, while some large independents may derive some of their capital from these markets, it will only be a portion and smaller independents will need to look elsewhere. Third, there is no guarantee that such capital will go into domestic production because even with regard to investment in exploration and production activities, capital must compete against other projects including international ones.

The next source of capital will be from the revenues generated by higher production and higher prices. First, the magnitude of this capital may be overstated because just as prices for oil and natural gas have increased, prices for drilling rigs and other costs are also increasing which will squeeze the capital that is available. Second, this capital will also be directed to the most promising projects, so there is no guarantee that it will be invested domestically. Third, this revenue will be significantly reduced by taxes.

The challenge, then, is to create a mechanism to direct the capital to domestic production. One such approach would be to create a "plowback" incentive that would apply to expenditures for *domestic* oil and natural gas exploration and production. This type of proposal would encourage capital formation and development of *domestic* wells provided it was immediately beneficial. Therefore, it would have to be creditable against both regular and AMT taxes and any excess available for carryback and carryforward. It would address the compelling need to improve natural gas supply as well as reduce the growing dependency on foreign oil. It must, in fact, apply to both oil and natural gas because they are inherently intertwined—often found together. Moreover, because of their inherent link, a healthy domestic natural gas exploration and production industry cannot exist without a healthy comparable oil industry. IPAA has identified two alternatives to create a plowback incentive.

The first would be a special deduction from gross income from the well. The deduction would be allowed for an amount equivalent to 50% of the costs incurred in the drilling and development of domestic oil and natural gas wells after December 31, 2001. These costs would include all Intangible Drilling Costs, Geological & Geophysical costs, equipment and related costs. In the event of a dry well, the costs would be allowed to offset qualifying gross income from other productive wells with any excess carried forward to offset future qualifying income of the taxpayer. Quali-

fying income is gross income from an oil or gas well, which was completed or recompleted by incurring additional qualifying costs after December 31, 2001. The deduction would be from gross income and would not reduce the costs or deductions generated by the expenditures themselves. Deductions in excess of gross income from a well could be carried forward or carried back to offset qualifying income from that well. If a well were plugged and abandoned prior to complete utilization of the deduction, the balance would be treated similarly to dry hole costs.

The second approach would be a 10% tax credit, based on the total drilling and development costs for wells drilled after 2001. These costs would include all Intangible Drilling Costs, Geological & Geophysical costs, equipment and related costs. The credit would apply against both the regular tax and the Alternative Minimum Tax. It could be carried back and carried forward. In order to obtain the credit, the taxpayer must be able to demonstrate that he has expended a like amount on similar development activity within 12 months following the end of the tax year to which the credit applies.

Structuring the federal tax code to allow greater revenues to be retained by energy producers who reinvest those revenues into new exploration and production can then enhance domestic investment. (An IPAA Fact Sheet detailing this issue follows this testimony.)

Conclusion

If Congress wants to see more *domestic* crude oil and natural gas production, it must recognize that federal tax policy plays a critical role in whether capital will flow toward this industry and the production of this resource. That has always been the case and it will continue to be. Domestic producers have always been "risk takers'. During these times of plentiful investment opportunities, they need some assistance in attracting capital (or retaining it for use internally) and directing it towards domestic projects. There are immediate actions that can and should be taken. The time is right. The nation is seeking a more stable energy supply. Congress should act.

FACT SHEET

Geological And Geophysical Costs

Geological and geophysical (G&G) surveys are used to locate and identify properties with the potential to produce commercial quantities of oil and natural gas, as well as to determine the optimal location for exploratory and developmental wells.

Proposal

Allow current expensing of geological and geophysical costs incurred domestically including the Outer Continental Shelf.

G&G expenses include the costs incurred for geologists, seismic surveys, and the drilling of core holes. These surveys increasingly use 3–D technology rather than the conventional 2–D technology used for most of the last seven decades. Previously only very large companies were able to utilize this state-of-the-art, computerintensive, 3–D technology because of its high cost and the considerable technical expertise it requires. However, as the costs of computer technology have declined, more and more domestic independent producers are making use of this technology. Still, while 3–D seismic provides a vastly superior tool for exploration, it is far more expensive than 2–D technology. 3–D seismic surveys usually cost between five or six times more per square mile onshore than the older technology and, in some instances can account for two-thirds of the costs of some wells. Encouraging use of this technology has many benefits:

- **More detailed information.** Conventional 2–D seismic is only able to identify large structural traps while 3–D seismic is able to pinpoint complex formations and stratigraphic plays.
- **Improved finding rates.** Producers are reporting 50–85% improvements in their finding rate. In prior years a producer might have to drill three to eight wells in order to find commercially viable production.
- **Reduced environmental impact.** Because the use of advanced seismic technology significantly improves the odds of drilling a commercially viable well on the first try, this reduces the number of wells that are drilled and, thus, reducing the footprint of the industry on the environment.
- **Investment capital.** Many investors are requiring producers to provide 3–D seismic surveys of potential development before committing their capital to the project in order to minimize their risk.

Current law treatment

G&G costs are not deductible as ordinary and necessary business expenses but are treated as capital expenditures recovered through cost depletion over the life of the field. G&G expenditures allocated to abandoned prospects are deducted upon such abandonment.

Reasons for change

These costs are an important and integral part of exploration and production for oil and natural gas. They affect the ability of domestic producers to engage in the exploration and development of our national petroleum reserves. Thus, they are more in the nature of an ordinary and necessary cost of doing business.

These costs are similar to research and development costs for other industries. For those industries such costs are not only deductible but a tax credit is available.

Crude oil imports are at an all-time high, which makes the U.S. vulnerable to sharp oil price increases or supply disruptions. The National Petroleum Council *Natural Gas* study concluded that natural gas supplies need to increase by over 30 percent by 2010 to meet demand. Domestic exploration and production must be encouraged now to offset this potential threat to national security, to meet future needs, and to enhance our economy. Allowing the deduction of G&G costs would increase capital available for domestic exploration and production activity.

The technical "infrastructure" of the oil services industry, which includes geologists and engineers, has been moving into other industries due to reduced domestic exploration and production. Stimulating exploration and development activities would help rebuild the critical oil services industry.

Encouraging the industry to use the best technology available and to reduce its environmental footprint are important public policy reasons to clarify that these ordinary and necessary business expenses for the oil and gas industry should be expensed.

Status

The Taxpayer Refund And Relief Act Of 1999 included a provision to allow expensing of G&G costs, but the bill was vetoed. Congress needs to pass legislation now to implement this common objective to enhance and preserve domestic oil and natural gas production.

March 2001

FACT SHEET

Tax Treatment of Delay Rentals

Delay rental payments are made by producers to an oil and gas lessor prior to drilling or production. Unlike bonus payments (made by the producer in consideration for the grant of the lease) which generally are treated as an advance royalty and thus capitalized, producers have historically been allowed to elect to deduct delay rental payments under Treasury Regulations 1.612–3(c). However, in September 1997, the IRS issued a coordinated issues paper stating that such payments are preproduction costs subject to capitalization under Section 263A of the Internal Revenue Code. The legislative history of Section 263A is unclear and subject to varying interpretation.

Proposal

Clarify that delay rental payments are deductible, at the election of the taxpayer, as ordinary and necessary business expenses.

Reasons for change

In passing the Section 263A uniform capitalization rules, Congress broadly intended to only affect the "unwarranted deferral of taxes." Congress did not intend to grant the IRS the authority to repeal the well-settled industry practice of deducting "delay rentals" as ordinary and necessary business expenses.

Treas. Reg. 1.612–3(c) states that, "a delay rental is an amount paid for the privilege of deferring development of the property and which could have been avoided by abandonment of the lease, or by commencement of development operations, or by obtaining production." Such payments represent ordinary and necessary business expenses, not an "unwarranted deferral of taxes." Given the clear disagreement over the legislative history and the likelihood of costly and unnecessary litigation to resolve the issue, clarification would eliminate administrative and compliance burdens on taxpayers and the IRS.

Status

The Taxpayer Refund And Relief Act Of 1999 included a provision to clarify that delay rental payments could be expensed, but the bill was vetoed. Congress needs to enact legislation to implement this common position if the Administration is unwilling to correct the current confusing interpretation of the tax code.

March 2001

FACT SHEET

Marginal Well Tax Credit

Summary of Legislation

The Marginal Well Production Tax Credit amendment to the Internal Revenue code will establish a tax credit for existing marginal wells. Marginal oil wells are those with average production of not more than 15 barrels per day, those producing heavy oil, or those wells producing not less than 95 percent water with average production of not more than 25 barrels per day of oil. Marginal gas wells are those producing not more than 90 Mcf a day. The amendment will allow a $3 a barrel tax credit for the first 3 barrels of daily production from an existing marginal oil well and a $0.50 per Mcf tax credit for the first 18 Mcf of daily natural gas production from a marginal well.

The tax credit would be phased in and out in equal increments as prices for oil and natural gas fall and rise. Prices triggering the tax credit are based on the annual average wellhead price for all domestic crude oil and the annual average wellhead price per 1,000 cubic feet for all domestic natural gas. The credit for the current taxable year is based on the average price from the previous year. The phase in/out prices are as follows:

OIL—phase in/out between $15 and $18

GAS—phase in/out between $1.67 and $2.00

The amendment would allow the tax credit to be offset against regular and the alternative minimum tax (AMT). In addition, for producers without taxable income for the current tax year, the amendment would provide a 10-year carryback provision allowing producers to claim the credit on taxes paid in those years. The carryback credit may be used to offset regular tax and AMT.

Reasons For Change

The 1994 National Petroleum Council's Marginal Wells report concluded:

> *Preserving marginal wells is central to our energy security. Neither government nor the industry can set the global market price of crude oil. Therefore, the nation's internal cost structure must be relied upon for preserving marginal well contributions.*

Marginal wells account for approximately 20 percent of domestic oil production, amount roughly equivalent to imports from Saudi Arabia. Producing an average of 2.2 barrels per day, these roughly 400,000 wells are the nation's true strategic petroleum reserve. They are, however, particularly at risk during periods of low prices. Therefore, a principal recommendation of the Marginal Wells report was the creation of a countercyclical marginal well tax credit.[1] The Dept. of Energy has evaluated the benefits of a tax credit and believes that it could prevent the loss of 140,000 barrels per day of production if fully employed during times of low oil prices like those of 1998 and 1999.

As the 107th Congress begins, legislation has been introduced in both the House and Senate to create a tax credit. If enacted now, this countercyclical credit would establish a safety net of support for these critical wells. As Congress addresses energy policy issues, IPAA believes a marginal wells tax credit should be an essential component.

March 2001

FACT SHEET

Eliminate The Net Income Limitation On Percentage Depletion

The net income limitation severely restricts the ability of independent producers to use percentage depletion, particularly with respect to marginal wells. Percentage depletion is already subject to many limitations. First, the percentage depletion allowance may only be taken by independent producers and royalty owners and not by integrated oil companies. Second, depletion may only be claimed up to specific daily production levels of 1,000 barrels of oil or 6,000 Mcf of natural gas. Third, de-

[1] It also recommended expanding the Enhanced Oil Recovery tax credit, an inactive well recovery tax credit, and expensing of capital expenditures associated with marginal wells.

pletion is limited to the net income from the property. Fourth, the deduction is limited to 65% of net taxable income. These limitations apply both for regular and alternative minimum tax purposes.

The net income limitation requires percentage depletion to be calculated on a property-by-property basis. It prohibits percentage depletion to the extent it exceeds the net income from a particular property. The typical independent producer can have numerous oil and gas properties, many of which could be marginal properties with high operating costs and low production yields. During periods of low prices, the producer may not have net income from a particular property, especially from marginal properties. When domestic production is most susceptible to being plugged, the net income limitation discourages producers from investing income to maintain marginal wells.

Proposal

Eliminate the net income limitation on percentage depletion.

Reasons for change

Marginal oil wells—those producing on average 15 barrels per day or less or producing heavy oil—account for approximately 20 percent of domestic oil production, an amount roughly equivalent to imports from Saudi Arabia. The U.S. is the only country with significant production from marginal wells. Once wells are plugged, access to the remaining resource is often lost forever. Eliminating the net income limitation on percentage depletion would encourage producers to keep marginally economic wells in production and enhance optimum oil and natural gas resource recovery.

The current requirement creates a paperwork and compliance nightmare for taxpayers and the Internal Revenue Service. Eliminating the net income limitation on percentage depletion would simplify recordkeeping and reduce the administrative and compliance burden for taxpayers and the IRS.

Current Status

The Taxpayer Relief Act of 1997 created a two-year suspension of the net income limitation on percentage depletion; this suspension has been extended through 2001. However, it is time to make this suspension permanent. If the country learned anything from the high oil and natural gas prices of 2000, it is that America needs to maintain and enhance its domestic oil and natural gas production. This tax reform allows more capital to be retained by producers where it can do the most good—producing more domestic oil and natural gas.

Legislation has been introduced to eliminate or further suspend the net income limitation provision for marginal wells. It should be enacted prior to 2002 when the current suspension ends.

March 2001

FACT SHEET

Percentage Depletion Expansion and Carryback Proposal

Current tax law limits the use of percentage depletion of oil and gas in several ways. First, the percentage depletion allowance may only be taken by independent producers and royalty owners and not by integrated oil companies. Second, depletion may only be claimed up to specific daily production levels of 1,000 barrels of oil or 6,000 Mcf of natural gas. Third, the net income limitation requires percentage depletion to be calculated on a property-by-property basis.[2] It prohibits percentage depletion to the extent it exceeds the net income from a particular property. Fourth, the deduction is limited to 65% of net taxable income. These limitations apply both for regular and alternative minimum tax purposes.

Percentage depletion in excess of the 65 percent limit may be carried over to future years until it is fully utilized. Many independent producers have been limited in the past because they have spent their income on continuing development of their properties, thereby reducing their taxable income. When oil prices dropped to historically low levels independent producers were unreasonably constrained by these tax provisions limiting their cash flow. They cannot use these carried over deductions. Now, when capital to develop oil and natural gas should be maximized, producers can be constrained due to the alternative minimum tax (AMT). Even if they could use the deductions, they may not benefit to the fullest extent possible from actual tax savings. This proposal would alleviate these limits by implementing the following changes:

[2] The net income limitation for marginal wells is suspended through 2001.

- By annual election, the 65 percent taxable income limitation would be reduced or eliminated for current and future tax years.
- Carried over percentage depletion could be carried back for ten years subject to the same annual election on taxable income limitation.

Status

Legislation has been introduced in the 107th Congress to eliminate or suspend the 65 percent net taxable income limit and to provide for carryback of carried over deductions.

Congress needs to include such provisions in future tax reform bills and the Administration needs to support such provisions to enhance and preserve domestic oil and natural gas production.

March 2001

FACT SHEET

Enhanced Oil Recovery

Section 43 of the Internal Revenue Code provides an enhanced oil recovery (EOR) credit equal to 15 percent of the qualified enhanced oil recovery costs incurred in a tax year. Existing Treasury guidelines for the section 43 tax credit are very narrow, generally including only expensive FOR processes—many of which are no longer in use. It excludes, however, many FOR processes that are the result of technological advances now considered common in the industry.

The Petroleum Technology Transfer Council (PTTC) in March 1997 compiled a list of FOR methods that should be included under section 43. This study was part of an industry effort to expand the FOR definition to include technologies that have proven potential for mitigating well abandonment and increasing oil production and resource recovery.

Proposal

Have the IRS review and expand the definition of methods qualifying for the FOR tax credit.

Reason for Change

The existing Treasury guidelines are based on 1979-vintage technology. This list has not kept pace with technology. A second rationale is the incentive generated by allowing domestic producers to position themselves to glean existing reservoirs in order to maximize production of existing reserves.

Two additional categories to the FOR list are proposed. Those categories include Enhanced Gravity Drainage (EGD) and Marginally Economic Reservoir Repressurization (MERR). Included under EGD would be horizontal drilling, multilateral well bores and large diameter lateral well bores. Included in MERR would be natural gas injection and waterflooding. Certain qualifiers and limiting factors include economic criteria for approved projects and incremental production limitations on each project.

By redefining the definition of FOR projects to include both EGD and MERR technologies, the FOR tax credit will encourage conservation measures to expand recovery of existing crude oil reservoirs and promote new drilling activity.

The benefit of these changes is well stated in the *National Energy Policy* report:

> Anywhere from 30 to 70 percent of oil, and 10 to 20 percent of natural gas, is not recovered in field development. It is estimated that enhanced oil recovery projects, including development of new recovery techniques, could add about 60 billion barrels of oil nationwide through increased use of existing fields

Congress needs to enact legislation to implement these definitional changes if the Administration is unwilling to correct the current constrained interpretation of the tax code.

June 2001

FACT SHEET

Plowback Incentive

Fundamentally, the question facing the nation is how to marshal the capital to develop its domestic resources. The 1999 NPC *Natural Gas* study estimates that an additional $10 billion over and above the current expenditure level will need to be invested annually in domestic production over the next fifteen years to meet the expected demand. To date this target has not been met; capital expenditures are essentially flat. At issue is how to obtain capital for domestic development. Independent producers are risk takers who will invest capital if it is available to find and produce more oil and natural gas. To encourage additional investment a method

needs to be created to "plow back" as much of the revenue from oil and natural gas sales as possible to develop new production. Structuring the federal tax code to allow greater revenues to be retained by energy producers who reinvest those revenues into new exploration and production can enhance domestic investment.

Proposal Alternatives

(1) A special deduction from gross income from the well would be allowed for an amount equivalent to 50% of the costs incurred in the drilling and development of domestic oil and natural gas wells after December 31, 2001. These costs would include all Intangible Drilling Costs, Geological & Geophysical costs, equipment and related costs. In the event of a dry well, the costs would be allowed to offset qualifying gross income from other productive wells with any excess carried forward to offset future qualifying income of the taxpayer. Qualifying income is gross income from an oil or gas well which was completed or re-completed by incurring additional qualifying costs after December 31, 2001. The deduction is from gross income and would not reduce the costs or deductions generated by the expenditures themselves. Deductions in excess of gross income from a well could be carried forward or carried back to offset qualifying income from that well. If a well were plugged and abandoned prior to complete utilization of the deduction, the balance would be treated similarly to dry hole costs.

(2) A 10% tax credit, based on the total drilling and development costs for wells drilled after 2001. These costs would include all Intangible Drilling Costs, Geological & Geophysical costs, equipment and related costs. The credit would apply against both the regular tax and the Alternative Minimum Tax. It could be carried back and carried forward. In order to obtain the credit, the taxpayer must be able to demonstrate that he has expended a like amount on similar development activity within 12 months following the end of the tax year to which the credit applies.

Reason for Change

The challenge is to create a mechanism to direct the capital to domestic production. One such approach would be to create a "plowback" incentive that would apply to expenditures for *domestic* oil and natural gas exploration and production. This type of proposal would encourage capital formation and development of *domestic* wells provided it was immediately beneficial. It would address the compelling need to improve natural gas supply as well as reduce the growing dependency on foreign oil. It must, in fact, apply to both oil and natural gas because they are inherently intertwined—often found together. Moreover, because of their inherent link, a healthy domestic natural gas exploration and production industry cannot exist without a healthy comparable oil industry.

May 2001

PREPARED STATEMENT OF KEVIN A. HASSETT

Chairman Baucus, ranking member Grassley, and Members of the Committee:

It is a great honor to be afforded the opportunity to speak with you today about the economics of tax credits. I have studied the impact of tax credits on the behavior of firms and individuals for many years, and recently coauthored a survey of the academic literature in this area prepared for inclusion in the *Handbook of Public Economics*, a text that is relied upon by most graduate economics programs to teach tax policy to aspiring economists. I believe that there are a number of important lessons from my research and the literature as a whole that this committee should be aware of.

Let me begin by focusing on what we know about the impact of tax credits that intend to encourage energy conservation by individuals. Tax incentives to stimulate conservation investment existed in many forms during the 1970s and 1980s. In addition to a federal credit, nine states also offered conservation incentives. The Federal Energy Tax Act of 1978 provided homeowners with tax credits to encourage conservation investment activities such as insulating walls and ceilings, replacing furnace burners and ignition systems, installing clock thermostats and weatherstripping. These investments received a credit of 15 percent, with a credit ceiling of $300. The Act also encouraged investment in solar, wind, and geothermal energy equipment. These investments received a higher credit of about 30 percent, which was raised to 40 percent by the Crude Oil Windfall Profits Tax Act of 1980. The credits expired in 1985.

Several years ago, my colleague Gilbert Metcalf of Tufts University and I gathered data to study the impact of the federal and state credit programs in research

that was funded by the National Science Foundation.[1] We found that the credits were fairly successful at stimulating conservation activity. While the federal credit was in effect, for example, we found that between 3 and 7 percent of tax returns claimed the credit in any given year. Cumulatively, between 1978 and 1985, more than 30 million tax returns likely claimed the credit.

Of course, a natural concern one might have is that taxpayers were going to invest in conservation anyway, and that the credit had little effect at the margin. Professor Metcalf and I used econometric techniques to investigate whether the credits had a statistically significant impact at the margin once we controlled for a number of other important factors such as energy prices. After the dust settled, we found that the credits did contribute significantly to conservation activity, and that a 10 percentage point credit would likely increase the probability of investing by about 24 percent.

As a final note, since the credit was so generous, we also explored whether it was fraudulently claimed. Using IRS audit data, we found that this was not a concern. Of the $560 million in credits claimed in the 1986 TCMP audit data, $531 million were found to be legitimate.

The literature on the impact of investment credits on firm behavior also suggests that credits induce a significant response. While the exact numerical response will clearly depend on the particular circumstances, there is very strong evidence that firms tilt their investments in response to tax incentives.

Typical of the literature is a study I coauthored with UC Berkeley economist Alan Auerbach several years ago.[2] Back in 1986, tax incentives for purchases of equipment and structures were changed dramatically as part of the Tax Reform Act of 1986. Professor Auerbach and I found that the mix of investments responded sharply to the changing tax code. Investment dropped the most in those assets that received the harshest tax treatment in the Tax Act. Subsequent studies have confirmed the finding that tax credits often have large effects.

That said, it is important to add that the impact of a tax policy is not a reasonable metric of its quality. Indeed, we need to be especially cautious about the application of credits precisely because they are so powerful. Economics teaches us that targeted tax credits are very often a bad idea. An efficient tax code should have as low a rate and as broad a base as possible. When the tax code plays favorites, it introduces distortions that can have a very high cost to society. This is particularly a concern today, when the numerous tax incentive programs that have been folded into the personal income tax, combined with their various phase-outs, have made the marginal tax rate structure bizarrely complex, and an efficiency nightmare.

With this warning in mind, it is nonetheless useful, especially at this hearing, to entertain the question, under what circumstances is it advisable to ignore the general result that the tax code should not play favorites? I believe that there is agreement in the profession that those circumstances are limited to the case where there is a clear externality associated with the activity. For example, if the use of a particular piece of machinery produces pollution as a byproduct, then it may be optimal for society to tax its use. Such circumstances arise whenever an economic decision by an individual agent has a secondary and important impact on others, and the optimal tax can be a subsidy if the external effect is positive. This is why a tax credit for conservation, as was in effect in the 1970s and 1980s, can be sensible policy. There are other examples as well outside of the energy area. There are several proposals being considered now that would subsidize investments in broadband network backbone equipment. Since the benefit to the network as a whole of new connections is high (the so-called "network externality") a subsidy may be advisable.

Tax legislation that favors investment in one type of asset over another likely has big effects. This means that the direct economic cost—or deadweight loss—of such policies is likely fairly large. On the other hand, if the benefits to society of the favored investments are high enough, the policy may still be a good idea. The benefit of lower pollution may outway the cost of higher distortion. In closing, I encourage this committee to weigh carefully and precisely these costs and benefits as it considers new tax credit policies.

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[1] "Energy Tax Credits and Residential Conservation Investment: Evidence From Panel Data." *Journal of Public Economics*, 57 (1995) 201–217

[2] "Recent U.S. Investment Behavior and the Tax Reform Act of 1986: A Disaggregate View," *Carnegie Rochester Conference Series on Public Policy* 35, 185–215 (1991).

RESPONSES TO QUESTIONS FROM SENATOR HATCH REGARDING VEHICLE EMISSIONS AND TAX POLICY

The objective of lowering vehicle emissions could certainly qualify as a sound economic objective of tax policy, provided that evidence were available suggesting that the reduction in emissions associated with the tax policy is achieved in a cost-effective manner. I am unaware of academic studies that have compared the benefit to society of lower emissions to the costs of distortions such as would be introduced by the CLEAR Act.

It may be that strategic considerations suggest that dependence on foreign oil may be costly, but from an economic perspective one would expect that a developed nation like our own would be a net importer of raw materials. Accordingly, trade imbalance of oil does not raise significant economic concerns.

Whatever effect a tax policy has, economists have usually assumed that it enters in a manner that would make it proportionate. Very little work has been done exploring whether a more nonlinear pattern better describes behavior, as might be the case if individuals do not respond much to a small credit, but respond in droves to a medium credit, and then provide little additional response to a large credit. That said, most studies suggest that a higher credit would raise the probability of observing a response. The CLEAR Act credits are quite generous, and comparable in size to those available in the 1970s for solar retrofits, etc. Those credits elicited a healthy response, but that response was not large enough to "mainstream" alternative energy investments. If the CLEAR Act credits are to work, it should be the case that the economics and aesthetics of the purchase decisions are rebalanced by the credit. I am not an expert on such issues, which require detailed knowledge of the likely options available at the time that the credit becomes law. However, I am comfortable saying that the following experiment would be quite instructive. Ask a manufacturer of covered vehicles, for example, to come to play the part of the salesman and attempt to convince a number of Senate staffers to purchase an alternative fuel vehicle, perhaps even allowing a test drive. If, after accounting for the credit, the car seems to be an attractive option, then the response observed in past papers may be a good guide to what type of response we might see. If, even after the credit, folks aware of the details are unwilling to purchase such a vehicle, then Americans likely will be as well.

PREPARED STATEMENT OF HON. ORRIN G. HATCH

Thank you Mr. Chairman. I applaud you for holding this important hearing today on tax incentives as a part of an overall transportation energy strategy. I commend you and Senator Grassley for working with me and other members of this committee to make these hearings informative and relevant to our nation's energy needs.

Transportation accounts for nearly two-thirds of the oil consumption in the United States, and we are 97 percent dependent on oil for all our transportation needs. When we consider the role transportation plays in our economy and our way of life, it is hard to believe that we rely on foreign nations for more than one-half of our oil supply. If our nation is going to have a strategy for energy security, that strategy must begin with transportation fuels.

I am in favor of increasing the development of our conventional energy resources in the U.S. However, I believe that our energy strategy would be grossly incomplete if it did not also help to increase the efficiency of our automobiles and to increase the diversity of our transportation fuels.

For three years now, Senators Rockefeller, Jeffords, and I have worked together to provide tax incentives to meet those goals. This year, with the additional help of Senators Kerry, Snowe, and others, we have introduced S. 760, the CLEAR ACT, which stands for Clean Efficient Automobiles Resulting from Advanced Car Technologies.

The CLEAR ACT is the most comprehensive legislation Congress has ever considered to promote the use of alternative fuel vehicles and advanced car technologies among consumers. It would provide tax credits for automobiles based on their environmental and fuel efficiency gains which result from alternative fuels or advanced car technologies. These tax credits would be targeted to consumers who purchase hybrid electric, fuel cell, battery electric, and dedicated alternative fuel vehicles. The CLEAR ACT also would award incentives for the purchase of alternative fuels and for the development of an alternative fuel infrastructure. Thus, the CLEAR Act focuses on both the chicken and the egg.

Also, Mr. Chairman, without imposing any new mandates, the CLEAR ACT would help our citizens to enjoy the health benefits of cleaner air and help our cities to

enjoy the economic benefits of attaining the EPA's clean air standards sooner than would otherwise be possible.

Again, I thank you, Mr. Chairman and Senator Grassley, and I look forward to hearing the testimony of our witnesses today.

PREPARED STATEMENT OF DANIEL M. KAMMEN

Introduction

Mr. Chairman and members of the Committee, thank you for this opportunity to appear before you today to provide testimony on the status of renewable energy and energy efficiency technologies. My name is Daniel Kammen, and I am Professor of Energy and Society in the Energy and Resources Group and in the Department of Nuclear Engineering, as well as Director of the Renewable and Appropriate Energy Laboratory (RAEL) at the University of California, Berkeley[1]. I am pleased to be able to present information on how to utilize the many important advances in renewable energy and energy efficiency technology, economics, and policy for the formulation of a strong national energy strategy. This critical initiative is long overdue, and is particularly relevant today as the California energy crisis illustrates the deficiencies in regional and national energy policy and planning. Additionally, as the threat of global climate change is becoming widely acknowledged in the U.S., there is finally a growing understanding that a responsible national energy policy includes a global climate change mitigation strategy that can be environmentally effective and economically advantageous.

I am concerned that the current crisis mentality pervading the discussions of energy issues in the country has fostered an ill-founded rush for "quick fix" solutions that, while politically expedient, will ultimately do the country more harm than good. It is critical to examine all energy options, and never before have so many technological solutions been available to address our energy needs. In the near term, some expansion of our fossil fuel, and particularly natural gas, supply is warranted to keep pace with rising demand. However, these measures should be balanced with measures to develop longer-term and cleaner energy solutions for the future. In general, while there are needs for new energy generation and infrastructure, energy efficiency and conservation represent our best short-term options, and even a natural gas-based strategy is not adequate in the long term to prevent the build up of unacceptably high CO_2 levels. The U.S. spent over $600 billion on energy last year, with U.S. oil imports climbing to $120 billion, or nearly $440 of imported oil for every American. These amounts would have been far higher if not for past investments in energy efficiency research and development (R&D) and deployment programs. We have made great strides with energy efficiency in this country, and substantial accomplishments with renewable energy as well. Renewable energy systems, notably solar, wind, and biomass—are poised to play a major role in the energy economy and environmental quality of the nation, but that potential demands greater examination and commitment to implementation. This is why I am particularly pleased, Mr. Chairman, that you are holding this hearing today.

In the last decade, the case for renewable energy has become compelling economically, socially, and environmentally. For many years renewables were seen as environmentally and socially attractive options that at best occupied niche markets due to barriers of cost and available infrastructure. That situation has *dramatically* changed. Renewable energy resources and technologies—notably solar, wind, small-scale hydro, and biomass based energy, as well as advanced energy conversion devices such as fuel cells—have undergone a true revolution in technological innovation, cost improvements, and in our understanding and analysis of appropriate applications[2]. There are now a number of energy sources, conversion technologies, and applications, where renewable energy options are either equal, or better, in price and services provided than the prevailing fossil fuel technologies. For example, in a growing number of settings in industrialized nations, wind energy is now the *least cost* option across *all* energy technologies with the added benefit of being modular and quick to install and bring on-line. In fact, some farmers, notably in the Midwest, have found that they can generate more income per hectare from the electricity generated by a wind turbine on their land than from their crop or ranching proceeds. Furthermore, photovoltaic panels and solar hot water heaters placed on buildings across America can: help reduce energy costs; dramatically shave peak-power demands; produce a healthier living environment; and increase our energy supply while managing our energy demand.

California's energy crisis has focused national attention and raised fundamental questions about regional and national energy strategies. Rising demand suggests the need for new energy supplies, and certainly some new energy capacity is needed.

However, there is a wide range of options for achieving supply and demand balance, and some of these options have not been given adequate attention. In general, the lack of past state and federal leadership has meant that we have seen too few incentives for renewable energy development, energy conservation, and efficiency measures, and too little attention to appropriate power plant siting issues and transmission and distribution bottlenecks. As a nation we also appear to be underestimating the importance of maintaining leadership in key technological and industrial areas, many of which are related to the energy sector.[3] This includes keeping pace with Japan and Germany in the production of solar photovoltaic systems, catching up with Denmark in wind and cogeneration system deployment, and with Japan, Germany, and Canada in the development of fuel cell systems. The development of these industries within the U.S. is vital to both our international competitiveness and commercial strength, and to our national security in providing for our own energy needs. Renewable and distributed energy systems and energy efficiency are areas experiencing tremendous market growth internationally. These systems combine the latest advances in energy conversion and storage, with improvements in computer and other advanced technologies, and are therefore natural areas for U.S. business interests and for U.S. strategic leadership. The U.S. must improve the financial and political climate for clean energy systems in order to reassert our leadership in this vital area.

Energy Policy and Financial Recommendations

- **Increase Federal R&D Funding for Renewable Energy and Energy Efficiency Technologies**

Federal investment in renewable energy and energy efficient technologies has been sparse and erratic, with each year producing an appropriations battle that is often lost. A combination of a federal program for steadily increasing funding and active political leadership would transform the clean energy sector from a good idea to a pillar of the new economy.

- **Provide Tax Incentives for Companies that Develop and Use Renewable Energy and Energy Efficiency Technologies**

Support for the production and further development of renewable fuels, all found domestically, would have a greater long-term effect on the energy system than any expansion of fossil-fuel capacity, with major health and environmental benefits as an added bonus. We should extend the existing production tax credits (PTC) for electricity generated from windpower and closed loop biomass for five years. Also, this production credit should be expanded to include electricity produced by open loop biomass (i.e., agricultural and forestry residues but excluding municipal solid waste), solar energy, geothermal energy, and landfill gas. The same credit should be provided to closed loop biomass co-fired with coal, and a smaller credit (one cent per kWh) should be provided for electricity from open-loop biomass co-fired with coal. These provisions (in part or full) are included in the Murkowski-Lott (S. 389) bill, Bingaman-Daschle bill (S. 596), Grassley bill (S. 530), Reid bill (S. 249), Dorgan bill (S. 94), Collins bill (S. 188), Filner bill (HR. 269), Foley bill (HR 876), Herger-Matsui bill (HR 1657), and Dunn bill (HR 1677). I also support a minimum of a 15 percent investment tax credit for residential solar electric and water heating systems. This proposal was introduced by Senator Allard (S. 465) and Representative Hayworth (HR 2076). It also is included in the Murkowski-Lott (S. 389) bill. In addition, I support a 30 percent investment tax credit being proposed for small (75 kW and below) windpower systems as in the Bingaman-Daschle (S. 596) bill.

- **Improved Federal Standards for Vehicle Fuel Economy and Increased Incentives for High Fuel Economy Vehicles**

I believe that given adequate lead-time a 40 mpg combined car and light truck fuel economy standard could be accomplished in the 2008 to 2012 timeframe with negligible net cost. I support the tax credits of up to $5,000 for hybrid electric vehicles, up to $6,000 for battery electric vehicles, and $8,000 for fuel cell vehicles, and an incentive scheme for energy-use performance that rewards both fuel savings and lower emissions, as proposed in the CLEAR Act, S. 760, introduced by Senators Hatch, Rockefeller, and Jeffords, and its companion bill (H.R. 1864) introduced by Rep. Camp.

Energy Policy and Financial Recommendations (continued)

- **A Federal Renewable Portfolio Standard (RPS) to Help Build Renewable Energy Markets**

I support a 20 percent RPS by 2020. A number of studies indicate that this would result in renewable energy development in every region of the country with most coming from wind, biomass, and geothermal sources. A transparent and properly constructed federal standard is needed to set a clear target for industry research, development, and market growth. I recommend a renewable energy component of 2 percent in 2002, growing to 10 percent in 2010 and 20 percent by 2020 that would include wind, biomass, geothermal, solar, and landfill gas. This standard is similar to the one proposed by Senators Jeffords and Lieberman in the 106th Congress (S. 1369).

- **Federal Standards and Credits to Support Distributed Small-Scale Energy Generation and Cogeneration (CHP)**

Small scale distributed electricity generation has several advantages over traditional central-station utility service, including reducing line losses, deferring the need for new transmission capacity and substation upgrades, providing voltage support, and reducing the demand for spinning reserve capacity. In addition, the location of generating equipment close to the end use allows waste heat to be utilized to meet heating and hot water demands, significantly boosting overall system efficiency. I support at least a 10 percent investment tax credit and seven-year depreciation period for renewable energy systems or combined heat and power systems with an overall efficiency of at least 60-70 percent depending on system size. Similar proposals are included in the Murkowski-Lott energy bill (S. 389), the Bingaman-Daschle energy bill (S. 596), as well as bills targeted to CHP promotion introduced by Rep. Wilson (H.R. 1045) and Rep. Quinn (H.R. 1945) in the House.

Renewable Energy

Conventional energy sources based on oil, coal, and natural gas have proven to be highly effective drivers of economic progress, but at the same time highly damaging to the environment and to human health. These traditional fossil fuel-based energy sources are facing increasing pressure on a host of environmental fronts, with perhaps the most being the looming threat of climate change and a needed reduction in our greenhouse gas (GHG) emissions. It is now clear that any effort to maintain atmospheric levels of CO_2 below even doubled pre-industrial levels[4] cannot be based on an oil and coal-dominated global economy, barring radical carbon sequestration efforts.

The potential of renewable energy sources is enormous as they can in principle meet many times the world's energy demand. Renewable energy sources such as biomass, wind, solar, hydropower, and geothermal can provide sustainable energy services while meeting the challenges of energy security, diversity, and regional needs as well as global environmental quality. A transition to a renewable-intensive energy economy is now possible given the consistent progress in cost and performance of renewable energy technologies, new methods for managing distributed energy generation, and a transformation of the transportation system. Costs of solar and wind power systems have dropped substantially in the past 30 years, and continue to decline, while the price of oil and gas continue to fluctuate. In fact, fossil fuel and renewable energy prices are heading in opposite directions when social and environmental costs are included. Furthermore, the economic and policy mechanisms needed to support the widespread dissemination of renewable energy systems have also rapidly evolved. Financial markets are awakening to the future growth potential of renewable and other new energy technologies, and this is a harbinger of fully competitive renewable energy systems.

In addition, renewable energy systems are ideal components of a decentralized power system that results in lower capital and environmental costs and improved opportunities for highly efficient cogeneration (combined heat and power) systems. As an alternative to customary centralized power plants, renewable systems based on photovoltaic (PV) arrays, windmills, biomass or small hydropower, can be mass-produced "energy appliances" capable of being manufactured at low cost and tailored to meet specific energy loads and service conditions. These systems can have dramatically reduced as well as widely dispersed environmental impacts, rather than larger, more centralized impacts that in some cases are serious contributors to ambient air pollution and acid rain. This evolution of our ability to meet energy needs with clean sources is only in its infancy, however, and policy leadership that rewards R&D, power generation from clean sources, and a leveling of the playing-field with existing power providers are all critical components of a sound energy strategy.

Recent Progress in Renewable Energy System Cost and Performance

There has been significant progress in cost reductions made by wind and PV systems, while biomass, geothermal, and solar thermal technologies are also experiencing cost reductions. In general, renewable energy systems are characterized by low or no fuel costs, although operation and maintenance (O&M) costs can be considerable. It is important to note, however, that O&M costs for all new technologies are generally high, and can fall rapidly with increasing familiarity and operational experience. Renewable energy systems such as photovoltaics contain far fewer mechanically active parts than comparable fossil fuel combustion systems, and therefore are likely in the long-term to be less costly to maintain. Figure 1 presents U.S. DOE projections for the levelized costs of electricity production from these same renewable energy technologies, from 1997 to 2030.

Given these potential cost reductions, recent analyses have shown that additional generating capacity from wind and solar energy can be added at low incremental costs relative to additions of fossil fuel-based generation. The economic case for renewables looks even better when environmental costs are considered along with capital and operating costs. As shown in Figure 2, geothermal and wind can be competitive with modern combined-cycle power plants, and geothermal, wind, and biomass all have lower total costs than advanced coal-fired plants, once approximate environmental costs are also included [5].

Leveling the Playing Field for Renewables: Public and Private Sector Investments and Market Transformations

As shown in Figure 2, renewable energy technologies are characterized by low environmental costs. In an ideal world, the relatively low environmental costs of renewables would aid them in competing with conventional technologies, but many of these environmental costs are "externalities" that are not priced in the market. Only in certain areas and for certain pollutants do these environmental costs enter the picture, and clearly further internalizing these costs would benefit the spread of renewables.

There are two principal rationales for government support of research and development (R&D) to develop renewables and other clean energy technologies. First, conventional energy prices generally do not reflect the social cost of pollution. This provides the rationale, based on a well-accepted economic argument, to subsidize R&D for alternatives to polluting fossil fuels. Second, private firms are generally unable to appropriate all the benefits of their R&D investments. Consequently, the social rate of return for R&D exceeds available private returns, and firms therefore do not invest enough in R&D to maximize social welfare. Thus, innovation "spillover" among clean energy firms is a form of positive externality that justifies public R&D investment. These provide compelling arguments for public funding of Market Transformation Programs (MTPs) that subsidize demand for some clean energy technologies in order to help commercialize them.

A principal motivation for considering MTPs is inherent in the production process itself. When a new technology is first introduced it is invariably more expensive than established substitutes. There is, however, a clear tendency for the unit cost of manufactured goods to fall as a function of cumulative production experience. Cost reductions are typically very rapid at first, but taper off as the industry matures. This relationship is called an 'experience curve' when it accounts for all production costs, and it can be described by a progress ratio where unit costs fall by a certain percent with every doubling of cumulative production. Gas turbines, photovoltaic cells and wind turbines have both exhibited the expected price-production relationship, with costs falling roughly 20 percent for each doubling of the number of units produced (Figure 3).

If firms retain the benefits of their own production experience they have an incentive to consider experience effects when deciding how much to produce. Consequently, they will "forward-price," producing at a loss initially to bring down their costs and thereby maximize profit over the entire production period.

In practice, however, the benefits of production experience often spill over to competitor firms, causing private firms to under-invest in bringing new products down the experience curve. Among other channels, experience spillovers could result from hiring competitors' employees, reverse engineering rivals' products, informal contacts among employees of rival firms, or even industrial espionage. Strong experience effects imply that output is less than the socially efficient level. MTPs can improve social welfare by correcting the output shortfall associated with these experience effects.[6]

This suggests a role for MTPs in national and international technology policies. MTPs are best limited to emerging technologies with steep industry experience curves, a high probability of major long-term market penetration once subsidies are

removed, and price elastic demand. The condition that they be clean technologies mitigates the risk of poor MTP performance by adding the value of displaced environmental externalities. The recent technical and economic advances seen for a range of products make them ideal candidates for support through market transformation programs, and I strongly urge federal action to reward the early production and use of clean energy technologies. Finally, as with energy R&D policy, public agencies should invest in a portfolio of new clean energy technologies in order to reduce overall MTP program performance risk through diversification.

Energy Efficiency

Historically, our nation's energy efficiency programs have been a resounding success. Last year, DOE documented the results of twenty of its most successful energy efficiency and renewable energy technologies and initiatives over the past two decades.[7] These technologies and activities have already saved the nation 5.5 quadrillion BTUs of energy, equivalent to the amount of energy needed to heat every household in the U.S. for about a year. The cost to taxpayers for these 20 activities was $712 million, less than 3 percent of the energy bill savings so far. In fact, the energy bill savings from these 20 projects alone is over three times the amount of money appropriated by Congress for all DOE energy efficiency and renewable energy programs during the 1990s, demonstrating that spending taxpayers money on energy efficiency R&D and deployment is a very sound investment.

There is often confusion about the definition of energy efficiency and energy conservation that is important to clarify. Energy efficiency means improving equipment and systems to get the same output (e.g., miles traveled or widgets produced) but with less energy input. Energy conservation means reducing energy use, and at times may mean reducing the services received. Examples of energy conservation include changing thermostat settings, reducing lighting levels, and driving less. To the extent energy conservation eliminates waste it is generally desirable. For example, many commercial buildings are excessively lit and over air-conditioned, wasting large amounts of energy without providing any useful service.

Energy efficiency has been the single greatest asset in improving the U. S. energy economy. Based on data published by the Energy Information Administration (EIA), the American Council for an Energy Efficient Economy (ACEEE) estimates that total primary energy use per capita in the U.S. in 2000 was almost identical to that in 1973. Over the same period, economic output per capita increased 74 percent. Also, national energy intensity (energy use per unit of GDP) fell 42 percent between 1973 and 2000. About 60 percent of this decline is attributable to real energy efficiency improvements and the rest is due to structural changes and fuel switching. If the United States had not dramatically reduced its energy intensity over the past 27 years, consumers and businesses would have spent at least $430 billion more on energy purchases in 2000. Between 1996 and 2000, GDP increased 19 percent while primary energy use increased just 5 percent. Today's energy problems would be dramatically worse if energy use had also increased by 19 percent during 1996–2000.[8]

In 1997 the President's Committee of Advisors on Science and Technology (PCAST), a panel that consisted mainly of distinguished academics and private sector executives and upon which I served, conducted a detailed review of DOE's energy efficiency R&D programs. Based on this review, we on the PCAST committee concluded that, "R&D investments in energy efficiency are the most cost-effective way to simultaneously reduce the risks of climate change, oil import interruption, and local air pollution, and to improve the productivity of the economy." PCAST further recommended that the DOE energy efficiency budget should be doubled between FY1998 and FY2003, and estimated that this investment could produce a 40 to 1 return for the nation including reductions in fuel costs of $15–30 billion by 2005 and $30–45 billion by 2010.[9]

Despite this potential, however, the U.S. continues to waste approximately 24 quadrillion BTUs in the production of electricity annually—more energy than is used by the entire Japanese economy for all end uses. According to DOE's recent Interlaboratory Working Group study, *Scenarios for a Clean Energy Future*, cost effective end-use technologies might reduce electricity consumption by 1,000 billion kWh by 2020, which would almost entirely offset business-as-usual projected growth in electricity use.[10] This level of savings is more than Japan now uses for its entire economy.

Energy efficiency improvement has contributed a great deal to our nation's economic growth and increased standard of living over the past 25 years, and there continues to be much potential for energy efficiency increases in the decades to come. It certainly represents the best short-term option for addressing today's environmental and energy concerns. The U.S. Department of Energy (DOE) estimates that increasing energy efficiency throughout the economy could cut national energy

use by 10 percent or more in 2010 and about 20 percent in 2020, with net economic benefits for consumers and businesses. The American Council for an Energy-Efficient Economy (ACEEE) estimates that adopting a comprehensive set of policies for advancing energy efficiency could lower national energy use by as much as 18 percent in 2010 and 33 percent in 2020, and do so cost-effectively [11]. Many of these changes can be accomplished at *negative cost*, while others can be realized for only a few cents/kWh, far less than the cost delivered by new power plants.

Interested consumers—both residential and commercial—lack access to information on energy efficient options. Such market barriers to energy efficiency technologies exist and will continue to persist if we do not invest in tax and market incentives to encourage their implementation in all sectors of our economy.

Policy Options for Renewable Energy and Energy Efficiency Technology Development

I firmly believe that the ultimate solutions to meeting our nation's energy needs must be based on private sector investment, bolstered by well-targeted government support such as tax incentives for emerging energy technologies and R&D. This must be coupled with policies that *open* markets to new generating capacity, rather than through federal subsidies for programs to increase energy supply using already mature technologies. This latter strategy would only generate near-term and incremental paybacks, while doing little to promote energy security or advance social and environmental goals. Instead, we now have the opportunity to build a sustainable future by engaging and stimulating the tremendous innovative and entrepreneurial capacity of the U.S. private sector. To accomplish this, we must pursue policies that guarantee a stable and predictable economic environment for advancing clean energy technologies. This can be further bolstered by market and tax incentives to reward actions that further the public good. With these thoughts in mind, I present several options that address both the short-term need to increase energy supply and the long-term goal to have a sustainable, economic and environmentally sound U.S. energy policy.

(1) Increase federal R&D funding for renewable energy and energy efficiency technologies

To date, federal investment in renewable energy and energy efficient technologies has been sparse and erratic, with each year producing an appropriations battle that is often lost. The resulting financial and policy uncertainty discourages effective energy technology development and deployment in the marketplace. With energy now a clear national priority, funding for the U.S. Department of Energy's Energy Efficiency and Renewable Energy Program must be substantially and systematically increased. The realization that R&D funding provides a critical driver to economic growth resulted in important commitments, particularly in the life sciences, to double R&D funding over the next five to ten years. The same return on investment exists in the energy sector, but it has not been translated into increased R&D funding for new renewable and energy efficiency technologies [12]. If the U.S. expects to be a world leader in this industry, as it is in the biomedical and high-tech sectors, such investments in renewable energy and energy efficiency are essential.

Federal funding and leadership for renewable energy and energy efficiency projects has resulted in a small number of notable successes, such as the *Energy Star* and *Green Lights Programs* that has now been emulated in a number of countries. For example, 15 percent of the public sector building space in the country has now signed up for the Energy Star Buildings Program and saved more than 21 billion kWh of energy in 1999 or $1.6 billion in energy bill savings according to EPA. Despite these achievements, funding in this area has been both scant, and so uneven that private sector involvement has actually been discouraged. A combination of a federal program for steadily increasing funding and active political leadership would transform the clean energy sector from a good idea to a pillar of the new economy. In particular, promising technologies such as fuel cells deserve special attention. Fuel cell development is attracting significant public and private funding and offers the promise of being a keystone technology for the ultimate transition from natural gas, petroleum, and coal energy to a renewable and hydrogen based energy economy.

(2) Provide tax incentives for companies and individuals that develop and use renewable energy and energy efficiency technologies

The R&D tax credit has proven remarkably effective and popular with private industry, so much so that there is a strong consensus in both Congress and the Administration to make this credit permanent. In addition to this support of private sector R&D, an increased tax incentive for R&D investment in renewable and energy efficiency technologies is exactly the type of well-targeted federal policy that is needed. To compliment this further, tax incentives directed toward those who use the technologies would provide the 'demand pull' to accelerate the technology trans-

fer process and rate of market development. The U.S. has largely lost its position as the global leader in energy innovation, resulting in the loss of jobs and earning potential for U.S. companies precisely at the time when the international market for clean energy technologies is booming. Our domestic industries as well as the global energy economy would both benefit directly and significantly from a clear commitment to U.S. clean energy leadership.

Currently, Federal tax expenditures have an unequal distribution across primary energy sources, distorting the market in favor of many conventional energy technologies. The dollar apportionment of expenditures, including income and excise tax credits as well as direct subsidies (such as the Renewable Energy Production Incentive) does not reflect the market distribution of fuels nor does it encourage the establishment of a market niche for disadvantaged emerging technologies (see table below). For example, renewable fuels make up four percent of the U.S. primary energy supply, and yet receive only one percent of Federal tax expenditures and direct expenditures combined. This does not include the alcohol fuels excise tax, directed towards ethanol production. The largest single tax credit in 1999 was the Alternative Fuel Production Credit[13], which totaled over one billion dollars. This income tax credit was designed to reduce dependence on foreign energy imports by encouraging the production of gas, coal, and oil from non-conventional sources (such as tight gas formations and coalbed methane) found within the United States. However, support for the production and further development of renewable fuels, all found domestically, would have a greater long-term effect on the energy system than any expansion of fossil-fuel capacity, with major health and environmental benefits as an added bonus.

FUEL SOURCE	PRIMARY ENERGY SUPPLY 1998 CONSUMPTION		DIRECT EXPENDITURES and TAX EXPENDITURES (1999)	
	VALUE (quads, quadrillion BTU)	PERCENT	VALUE (million $)	PERCENT
Oil	36.57	40%	263	16%
Natural Gas *Alternative Fuels Credit*	21.84	24%	1,048 *(1,030)*	64%
Coal	21.62	24%	85	5%
Oil, Gas, Coal Combined			205	12%
Nuclear	7.16	8%	0	-
Renewables	3.48	4%	19	1%
Electricity			40	2%
Total	90.67	100%	1660	100%

Energy Information Administration, *Federal Financial Interventions and Subsidies in Energy Markets 1999: Primary Energy*, (Washington, DC: DOE, 1999)

Renewables

We should extend the existing production tax credits (PTC) for electricity generated from windpower and closed loop biomass for five years. Also, this production credit should be expanded to include electricity produced by open loop biomass (i.e., agricultural and forestry residues but excluding municipal solid waste), solar energy, geothermal energy, and landfill gas. The same credit should be provided to closed loop biomass co-fired with coal, and a smaller credit (one cent per kWh) should be provided for electricity from open-loop biomass co-fired with coal. These provisions (in part or full) are included in the Murkowski-Lott (S. 389) bill, Bingaman-Daschle bill (S. 596), Grassley bill (S. 530), Reid bill (S. 249), Dorgan bill (S. 94), Collins bill (S. 188), Filner bill (HR. 269), Foley bill (HR 876), Herger-Matsui bill (HR 1657), and Dunn bill (HR 1677). As evidenced by the number of bills introduced the extension and expansion of the PTC has been garnering strong and consistent support in Congress with many of the strongest proponents on this committee. The wind credit has proven to be successful in encouraging strong growth of U.S. wind energy in the last few years, with a 30 percent increase in 1998 and 40 percent increase in 1999, and approximately 2,000 MW of wind energy under development or proposed for completion before the end of 2001 (a 40 percent increase), when the federal wind energy PTC is scheduled to expire. While the U.S. was once the world leader in installed wind energy capacity we have since dropped to second place behind Germany, which now has twice the U.S. installed capacity[14]. In addi-

tion, the major wind turbine manufactures are now in Europe. Clearly we need to continue our support for wind energy and extend these benefits, which create jobs, help our environment and increase our fuel security, to the other renewables thereby leveling the playing field and further diversifying our renewable resources.

I also support a minimum of a 15 percent investment tax credit for residential solar electric and water heating systems. In this case, an investment credit is preferable to a production credit due to the relatively high cost of smaller scale solar technologies at this time. This proposal was introduced by Senator Allard (S. 465) and Representative Hayworth (HR 2076). It also is included in the Murkowski-Lott (S. 389) bill. In addition, I support a 30 percent investment tax credit being proposed for small (75 kW and below) windpower systems. These are used in commercial and farm applications and are relatively costly compared to large wind turbines (500 kW and up). This proposal is included in the Bingaman-Daschle (S. 596) bill.

Energy Efficiency

Many new energy-efficient technologies have been commercialized in recent years or are nearing commercialization. But these technologies may never be manufactured on a large scale or widely used due to their initial high cost, market uncertainty, and lack of consumer awareness. Tax incentives can help manufactures justify mass marketing and help buyers and manufactures offset the relatively high first cost premium for new technologies, thereby building market share and reducing costs through economies of scale. Tax incentives should be offered for a variety of innovative energy-efficient technologies such as highly efficient homes, commercial buildings, and appliances. A key element in designing the credits is for only high efficiency products to be eligible. If eligibility is set too low then the cost to the Treasury will be high and incremental energy savings low since the incentives will have paid for sales that happen anyway. For this reason these tax credits should have limited duration and be reduced in value over time since once these new technologies become widely available and produced on a significant scale costs should decline. In this manner the credits help innovative technologies get established in the marketplace rather than becoming a permanent subsidy.

A number of tax bills to encourage high efficiency technologies have recently been introduced. These include:

- $50–100 for highly efficient clothes washers and refrigerators, the two highest energy consumers in households, is included in bills by Senators Lincoln, Allard and Grassley (S. 686) as well as Murkowski-Lott (S. 389) and Bingaman-Daschle (S. 596) and Representative Nussle (H.R. 1316).
- $2,000 for highly efficient new homes introduced by Senator Bob Smith (S. 207) as well as the Murkowski-Lott (S. 389) and Bingman-Daschle (S. 596) energy bills.
- 20 percent investment tax credit for innovative building technologies such as furnaces, stationary fuel cells, gas-fired pumps, and electric heat pump water heaters is in Bingaman-Daschle (S. 596) energy bill with parts introduced by Representative Nancy Johnson (H.R. 1275).
- $2.25 per square foot tax deduction for investments in commercial buildings that achieve a 50 percent of greater reduction in heating and cooling costs compared to buildings meeting current model codes. This is included in legislation by Senator Bob Smith (S. 207) and Representative Cummingham (H.R. 778).

Incentives of this magnitude would have a relatively modest direct impact on energy use and CO_2 emissions, saving on the order of 0.3 quadrillion BTU of energy and 5 million metric tons of carbon emissions per year by the end of the eligibility period. I would favor stronger incentives, however, if the credits help to establish these innovative products in the marketplace and reduce the first cost premium so that the products are viable after the credits are phased out, then the indirect impacts of the incentive could be many times greater than the direct impacts. Total energy savings could potentially reach 1 quadrillion BTU by 2010 and 2 quadrillion BTU by 2015 if these credits are successfully implemented [15].

While tax measures send a clear signal of support to suppliers and consumers who purchase and manufacture innovative clean technologies, another important strategy for promoting energy efficiency is the implementation of building and equipment standards. Tax credits, while important, do not necessarily remove all the market barriers that prevent clean energy technologies from spreading throughout the marketplace. Minimum efficiency standards were adopted by President Reagan in 1987, and then expanded under President Bush in 1992, because market barriers inhibited the purchase of efficient appliances and equipment. These barriers include lack of awareness, rush purchases when an existing appliance breaks down, and purchases by builders and landlords. Figure 4 shows how federal stand-

ards dramatically increased the market share of highly efficient magnet ballasts used for lighting.

Standards remove inefficient products from the market but still leave consumers with a full range of products and features to choose among. Building, appliance and equipment standards have proven to be one of the federal government's most effective energy-saving programs. Analyses by DOE and others indicate that in 2000, appliance and equipment efficiency standards saved 1.2 quadrillion BTUs of energy (1.3 percent of U.S. electric use) and reduced consumer energy bills by approximately $9 billion with energy bill savings far exceeding any increase in product cost. By 2020, standards already enacted will save 4.3 quadrillion BTU/year (3.5 percent of projected U.S. energy use), and reduce peak electric demand by 120,000 MW (more than a 10 percent reduction). ACEEE estimates that energy could be reduced in 2020 by 1.0 quadrillion BTU by quickly adopting higher standards for equipment currently covered under federal law, such as central air-conditioners and heat pumps, and by adopting new standards for equipment not covered, such as torchiere (halogen) light fixtures, commercial refrigerators and reduction of appliance's standby power consumption (see Figure 5 for standby power used by today's televisions). Consumers and businesses would see their energy bills decline by approximately $7 billion per year by 2020. Additional savings can be achieved by future updates and expansions to the appliance standards program; the savings estimated here just apply to actions that can be taken in the next few years [16].

(3) Improve federal standards for vehicle fuel economy and increase incentives for high fuel economy vehicles

New vehicles types based on hybrid gasoline-electric and fuel cell-electric power systems are now being produced in commercial (gasoline hybrid) and prototype (fuel cell) quantities. These vehicles are combining high-efficiency AC induction or permanent magnet electric motors with revolutionary power systems to produce a new generation of motor vehicles that are vastly more efficient than today's simple cycle combustion systems. The potential for future hybrid and fuel cell vehicles to achieve up to 100 miles per gallon is believed to be both technically and economically viable in the near-term, and with continued commitments from industry, only clear federal guidelines and support are needed to move from planning to reality. In the longer term, fuel cell vehicles running directly on hydrogen promise to allow motor vehicle use with very low fuel-cycle emissions, and again better government and industry coordination and cooperation over the next ten years could do much to hasten the development of this promising technology.

The improvements in fuel economy that these new vehicle types offer will help to slow growth in petroleum demand, reducing our oil import dependency and trade deficit. While the Partnership for a New Generation of Vehicles helped to generate some vehicle technology advances, an increase in the Corporate Average Fuel Economy (CAFE) standard, which has been stagnant for 12 years now, is required to provide an incentive for companies to bring these new vehicles types rapidly to market. Tax credits and incentives are an important complement to raising CAFE, but we do not believe that they alone can accomplish the key goal of simultaneously stimulating production of high fuel economy vehicles and provide strong incentives for consumers to purchase them.

Now, after five years of Congressional bans, studies on the potential for increases in CAFE standards to cost-effectively reduce petroleum demand are now underway by the Department of Transportation and the National Academy of Sciences. These studies, with results expected later this summer, will help to suggest optimal levels of increased standards, given the costs and benefits of higher fuel economy, as well as phase-in schedules that will protect the competitive interests of domestic automakers.

In the meantime, other recent analyses of the costs and benefits of providing higher fuel economy motor vehicles have been conducted by the Union of Concerned Scientists,[17] [18] MIT,[19] OTA,[20] and Oak Ridge National Lab/ACEEE.[21] These studies have generally concluded that with longer-term technologies, motor vehicle fuel economy can be raised to 45 mpg for cars for $500 to $1,700 per vehicle retail price increase,[22] and to 30 mpg for light trucks for $800 to $1,400 per vehicle retail price increase.[23] These improvements could be the basis for a new combined fuel economy standard of 40 mpg, which could be instituted after first removing the separate fuel economy standards for cars and light trucks (i.e. closing the light truck 'loophole' as proposed in S. 804 by Senators Feinstein and Snowe and H.R. 1815 by Rep. Olver). We believe the 40 mpg combined car and light truck standard could be accomplished in the 2008 to 2012 timeframe with negligible net cost once fuel savings are factored in, given adequate lead time for the auto industry to re-tool for this new generation of vehicles.

I also strongly support tax credits for hybrid electric vehicles, battery electric vehicles, fuel cell vehicles. These funds could in principle be raised through a revision of the archaic 'gas guzzler' tax, which does not apply to a significant percentage of the light duty car and truck fleet. The tax penalty and tax credit in combination could be a revenue-neutral 'fee-bate' scheme, similar to one recently proposed in California, that would simultaneously send two strong price signals rewarding economical vehicles (particularly those using advanced drive systems) and penalizing uneconomical ones. Furthermore, this would help jump start introduction and purchase of the most innovative, fuel-efficient technologies. However the incentives are designed, they should be based primarily on energy-use performance and ideally provide both fuel savings and lower emissions. I support the CLEAR Act, S. 760, introduced by Senators Hatch, Rockefeller, and Jeffords, and the companion bill (H.R. 1864) introduced by Rep. Camp.

(4) A federal Renewable Portfolio Standard (RPS) to help build renewable energy markets

The RPS is a renewable energy content standard, akin to efficiency standards for vehicles and appliances that have proven successful in the past. A gradually increasing RPS provides the most economically efficient way of ensuring that a growing proportion of electricity sales are provided by renewable energy, and is designed to integrate renewables into the marketplace in the most cost-effective fashion. In this manner, the market picks the winning and losing technologies and projects, not administrators. With all the discussion and hype about market forces, a RPS provides the one true means to use market forces most effectively. I recommend a renewable energy component of 2 percent in 2002, growing to 10 percent in 2010 and 20 percent by 2020 that would include wind, biomass, geothermal, solar, and landfill gas. A number of studies indicate that this 20 percent in 2020 level of an RPS is broadly good for business and can readily be achieved[24,25]. This standard is similar to the one proposed by Senators Jeffords and Lieberman in the 106th Congress (S. 1369). This bill has not been reintroduced nor has any other RPS legislation been introduced in this Congress yet. States that decide to pursue more aggressive goals—many of which make economic and environmental sense—could be rewarded through an additional federal incentive program. To achieve compliance a federal RPS should use market dynamics to stimulate innovation through an active trading program of renewable energy credits. Renewable credit trading is analogous to the sulfur allowance trading system established in the Clean Air Act. Like emissions trading, it is designed to be administratively simple and to increase flexibility and decrease the cost of compliance with the standard. Electricity suppliers can generate renewable electricity themselves, purchase renewable electricity and credits from generators, or buy credits in a secondary trading market.

The coal, oil, natural gas, and nuclear power industries are mature; yet continue to receive considerable government subsidies. Moreover, the market price of fossil and nuclear energy does not include the cost of the damage they cause to the environment and human health. Conversely, the market does not give a value to the environmental and social benefits of renewables. Without the RPS or a similar mechanism, many renewables will not be able to compete in an increasingly competitive electricity market focused on producing power at the lowest direct cost. The RPS is designed to deliver renewables that are most ready for the market. Additional policies are still needed to support emerging renewable technologies, like photovoltaics, that have enormous potential to eventually become commercially competitive through targeted investment incentives. Smart investors typically acquire a portfolio of stocks and bonds to reduce risk. Including renewables in America's power supply portfolio would do the same by protecting consumers from fossil fuel price shocks and supply shortages. A properly designed RPS will also establish a viable market for the long-term development of America's renewable energy industries, creating jobs at home and export opportunities abroad.

The RPS is the surest market based approach for securing the public benefits of renewables while supplying the greatest amount of clean power for the lowest price. It creates an ongoing incentive to drive down costs by providing a dependable and predictable market, which has been lacking in this country. The RPS will reduce renewable energy costs by:

- Providing a revenue stream that will enable manufacturers and developers to obtain reasonable cost financing and make investments in expanding capacity to meet an expanding renewable energy market.
- Allowing economies of scale in manufacturing, installation, operation and maintenance of renewable energy facilities.
- Promoting vigorous competition among renewable energy developers and technologies to meet the standard at the lowest cost.

- Inducing development of renewables in the regions of the country where they are the most cost-effective, while avoiding expensive long-distance transmission, by allowing national renewable energy credit trading.
- Reducing transaction costs, by enabling suppliers to buy credits and avoid having to negotiate many small contracts with individual renewable energy projects.

Analysis of the 20 percent RPS target in 2020 that I strongly support would result in renewable energy development in every region of the country with most coming from wind, biomass, and geothermal sources. In particular, the Plains, Western, and Mid-Atlantic States would generate more than 20 percent of their electricity from renewables as shown in Figure 6. Electricity prices are projected to fall 13 percent between 1997 and 2020 under this RPS, while not as much as the projected 18 percent decrease under business-as-usual without an RPS, is nonetheless a substantial decrease and has the added environmental and health benefits from cleaner energy generation nation-wide (see Figure 7)[26]. This increase in renewable energy would also reduce some of the projected rise in natural gas prices for all gas consumers by 5 percent in 2020 again saving households money who heat with natural gas.

Texas has been a leader in developing and implementing a successful RPS that then Governor Bush signed into law in 1999. The Texas law requires electricity companies to supply 2,000 MW of new renewable resources by 2009. The state may meet this goal by the end of 2002, seven years early. The RPS has also been signed into law in Arizona, Connecticut, Maine, Massachusetts, Nevada, New Jersey, New Mexico, Pennsylvania, and Wisconsin. Minnesota and Iowa also have minimum renewables requirements similar to an RPS. Bills with the RPS are also pending in several states. Variations in the details of these programs have kept them from being overly successful. A clear and properly constructed federal standard would correct these problems, and set a clear target for industry research, development, and market growth[27].

(5) Federal standards to support distributed small-scale energy generation and cogeneration (CHP)

Small scale distributed electricity generation has several advantages over traditional central-station utility service. Distributed generation reduces energy losses incurred by sending electricity through an extensive transmission and distribution network (often an 8–10 percent loss of energy), defers the need for new transmission capacity and substation upgrades, provides voltage support, and reduces the demand for spinning reserve capacity. In addition, the location of generating equipment close to the end uses allows waste heat to be utilized to meet heating and hot water demands, significantly boosting overall system efficiency.

Distributed generation has faced several barriers in the marketplace, most notably from complicated and expensive utility interconnection requirements. These barriers have led to a push for national safety and power quality standards, currently being finalized by the Institute of Electrical and Electronics Engineers (IEEE). Although adoption of these standards would significantly decrease the economic burden on manufacturers, installers, and customers, the utilities are allowed discretion in adopting or rejecting these standards. Therefore, a Federal mandate to require utilities to accept these standards, along with tax incentives for utilities and customers who use distributed generation systems would ease their acceptance into the marketplace.

While all distributed generation systems have the advantage of lower line losses, there is large variability in the overall efficiencies of the systems based on system type and installation. It is important to design credits based on overall efficiency and offset emissions compared to central station generation. This is accomplished by giving highest priority to renewable systems or fossil fuel systems that utilize waste heat through combined heat and power designs. While a distributed generation system may achieve 35–45 percent electrical efficiency, the addition of heat utilization can raise overall efficiency to 80 percent. U.S. CHP capacity in 1999 totaled 52,800 MW of power, but the estimated potential is several times this. Industrial CHP potential is estimated to be 88,000 MW, the largest sectors being in the chemicals and paper industries. Commercial CHP potential is estimated to be 75,000 MW, with education, health care, and office building applications making up the most significant percentages[28] (see Figure 8). This tremendous resource has the advantage of offsetting separate electric and fossil fuel heating systems, but CHP applications are only feasible through the use of onsite distributed electricity generation.

I support at least a 10 percent investment tax credit and seven-year depreciation period for renewable energy systems or combined heat and power systems with an overall efficiency of at least 60–70 percent depending on system size. Similar proposals are included in the Murkowski-Lott energy bill (S. 389), the Bingaman-Daschle energy bill (S. 596), as well as bills targeted to CHP promotion introduced

by Rep. Wilson (H.R. 1045) and Rep. Quinn (H.R. 1945) in the House. It is important to note again that these measures would be most effective coupled with mandated utility interconnection requirements.

The U. S. should pursue a policy of not only net-metered energy use, but also *real-time pricing* where homeowners, businesses, and industry can all participate fully in supplying their excess power generation into the market. Homes with solar photovoltaic, wind, or fuel-cell systems should be able to sell their excess energy. Opening the energy supply markets to local generation will provide strong, economically sound, signals to the utilities, the Qualifying Facilities, and homeowners that the energy market is fair, accessible, and one where clean energy generation will be rewarded. The investment in the grid, largely in the form of upgrades to local substations, will lead to further energy efficiency benefits as an added bonus. Federal leadership and standards are needed to guide this transformation.

Cost and Benefit Analysis of Clean Energy Policies on Electricity Generation

I agree wholeheartedly with the findings of the recent Union of Concerned Scientists', report, *Clean Energy Blueprint: A Smarter National Energy Policy for Today and the Future* [29], which examines the costs, environmental impacts, and effects on fossil fuel prices and consumer energy bills of a package of clean energy polices affecting electricity generation. These policies include: incentives for consumers to purchase more efficient appliances, stricter energy codes for buildings, residential and commercial building retrofits; voluntary programs with industry to reduce energy use meaningfully, a RPS requiring electricity providers to obtain 20 percent of their supplies from renewables power sources by 2020 using tradable renewable energy credits, an expanded production tax credit to include all renewables; and a public benefits fund funded through a $0.002/kWh charge to customers.

This analysis is based on the Energy Information Administrations National Energy Modeling Systems (NEMS) with modifications used in the Interlaboratory Working Group's study to accurately account for the growth and costs of the renewable and energy efficiency technologies modeled. Under the business-as-usual scenario the nation is expected to increase its reliance on coal and natural gas to meet strong growth in electricity use of 42 percent by 2020 as shown in Figure 9. To meet this demand it is estimated that 1,300 300-MW power plants would need to be built with electricity generation from non-hydro renewables increasing from 2 percent today to only 2.4 percent of total generation in 2020. This amounts to a policy of energy and economic stagnation. If, on the other hand, the set of clean energy polices listed above are implemented energy efficiency and renewables will meet a much larger share of our future energy needs with energy efficiency measures almost completely offsetting the projected business-as-usual growth in electricity (Figure 10). Unlike the Bush-Cheney energy plan, this clean energy strategy plan builds energy security for the U.S. by supporting energy diversity and domestic supplies. The result is a large decrease in emissions from the utilities sector compared to business-as-usual projections with declines continuing beyond 2020. Figure 11 compares the projected power plant carbon dioxide reductions with the level proposed by the Senator Jeffords' and Representative Waxman's 4-pollutant power plant emission reduction bills (S. 556 and H.R. 1256). Through a steady shift to clean energy production, the requirements of these bills would not be difficult or expensive to meet, and if anything are expected to increase U.S. economic activity.

The more efficient use of energy and the switch from fossil fuels to renewable energy sources saves consumers money by decreasing energy use in homes, businesses, and industry. This results in price drops for natural gas, as shown in Figure 12, and lower household electricity bills than business-as-usual predicts (Figure 13) and average consumer prices about the same. One of the greatest advantages that energy efficiency and renewable energy sources offer over new power plants, transmission lines, and pipelines is the ability to deploy these technologies very quickly [30]. We can begin to deploy these technologies now and so reap the benefits all that much sooner [31].

A range of studies are all coming to the conclusion that simple but sustained standards and investments in a clean energy economy are not only possible but would be highly beneficial to our nation's future prosperity.[32] A recent analysis of the whole economy shows that we can easily meet Kyoto type targets with a net increase of 1 percent in the Nation's GDP 2020 [33]. The types of energy efficiency and renewable technologies and policies described have already proven successful and cost-effective at the national and state level. I argue that this is even more reason to increase their support. This will cost-effectively enable us to meet goals of GHG emission reductions [34] while providing a sustainable clean energy future.

Conclusions

We stand at a critical point in the energy, economic, and environmental evolution of the United States. Renewable energy and energy efficiency are now not only affordable, but their use will also open new areas of innovation and technological and economic leadership for the U. S., if we choose to embrace these options. Creating opportunities and—critically—a fair market place for a clean energy economy requires leadership and vision. The tools to implement this evolution are now well known, and are listed in the previous section. I look forward to the opportunity to work with you to put these cost-effective measures into effect.

Biographical Sketch: Daniel M. Kammen

Daniel M. Kammen received his undergraduate degree physics from Cornell University 1984, and his Masters (1986) and Doctorate (1988) degrees in physics, from Harvard University. He was a Bantrell & Weizmann Postdoctoral Fellow at the California Institute of Technology, and then a lecturer in the Department of Physics at Harvard University. From 1992–1998 Kammen was on the faculty of the Woodrow Wilson School of Public and International Affairs at Princeton University, where he was Chair of the Science, Technology and Environmental Policy Program. Kammen is now Professor of Energy and Society in the Energy and Resources Group (ERG), and in the Department of Nuclear Engineering at the University of California, Berkeley. At Berkeley Kammen is the founding director of the Renewable and Appropriate Energy Laboratory (*http://socrates.berkeley.edu/rael*), and is campus representative to the University of California Energy Institute. He has been a Lecturer in Physics and Natural Science at the University of Nairobi.

Kammen's research centers on the science, engineering, economics and policy aspects of energy management, and dissemination of renewable energy systems. He also works on the health and environmental impacts of energy generation and use; rural resource management, including issues of gender and ethnicity; international R&D policy, climate change; and energy forecasting and risk analysis. He is the author of over 110 journal publications, a book on environmental, technological, and health risks (*Should We Risk It?*, Princeton University Press, 1999) and numerous reports on renewable energy and development. Kammen received the *1993 21st Century Earth Award* and is a Fellow of the American Physical Society. He is a Permanent Fellow of the African Academy of Sciences. For information of any of these activities and for copies of Professor Kammen's writings, see http://socrates.berkeley.edu/dkammen.

Figure 1. Levelized cost of electricity forecast for renewable energy technologies (U.S. DOE, 1997)

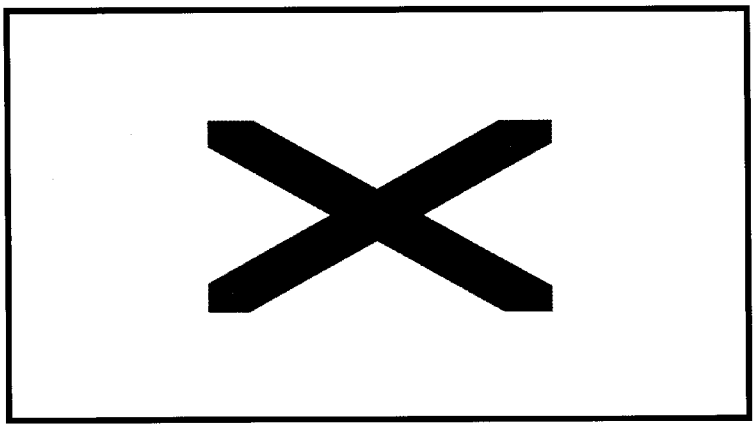
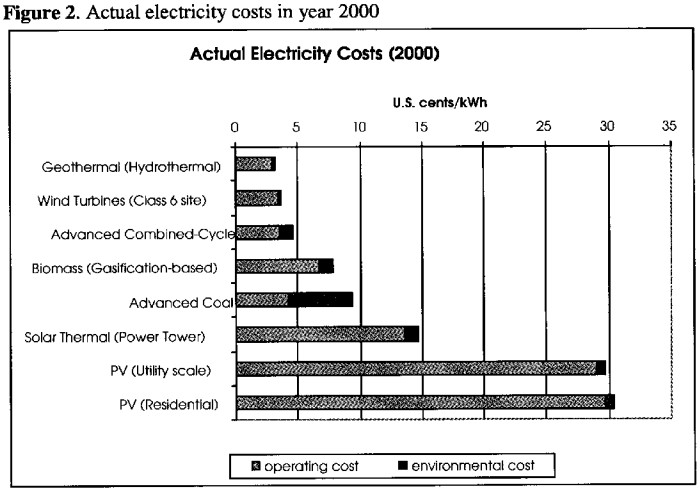
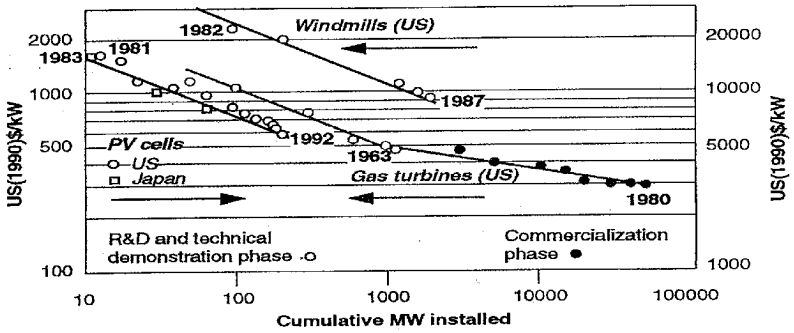


Figure 2. Actual electricity costs in year 2000



Source: Ottinger, R. L. *et al.* (1991) *Environmental Costs of Electricity* (Oceana Publications, Inc: New York); U.S. Department of Energy (2000), *Annual Energy Outlook 2000*, DOE/EIA-0383(00), Energy Information Administration, Washington, D. C., December; U.S. DOE, 1997.

Figure 3. Progress ratios (experience curves) for photovoltaics, windmills, and gas turbines



Source: IIASA/WEC (1995) *Global Energy Perspectives to 2050 and Beyond* (Laxenburg, Austria and London, UK).

Figure 4. Market Share of efficient magnetic ballasts for lighting (Interlaboratory Working Group, 2000)

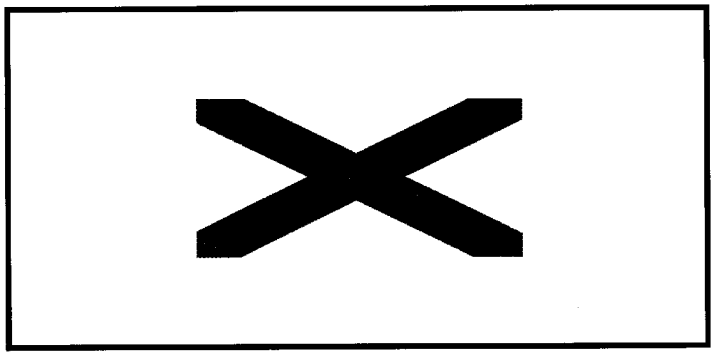
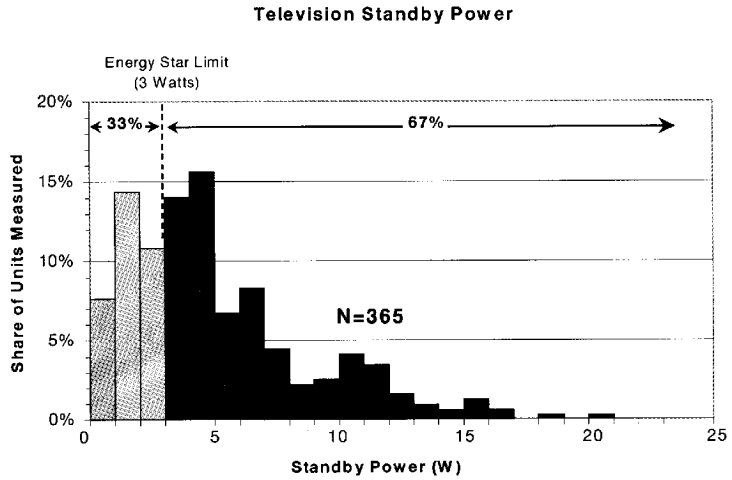


Figure 5. Standby power consumption for a selection of 365 televisions



NOTE: Excludes the 7 of 372 TVs (1.9%) that did not have standby losses

Source: K. Rosen, LBNL, US DOE 1999.

Figure 6. Renewable energy generation in the U.S. by region for a RPS with a 20 percent target in 2020 (Clemmer, 1999)

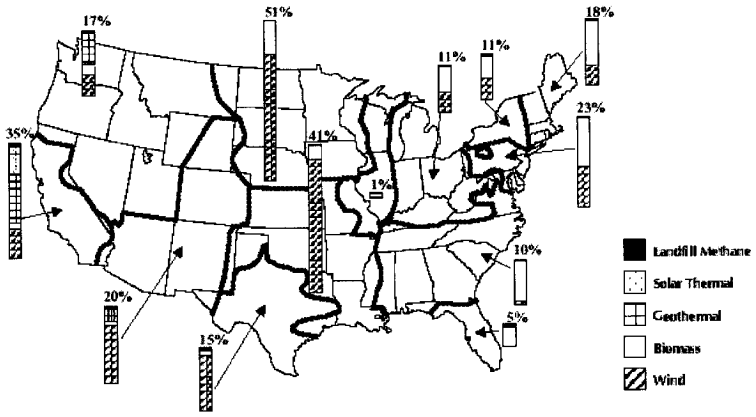
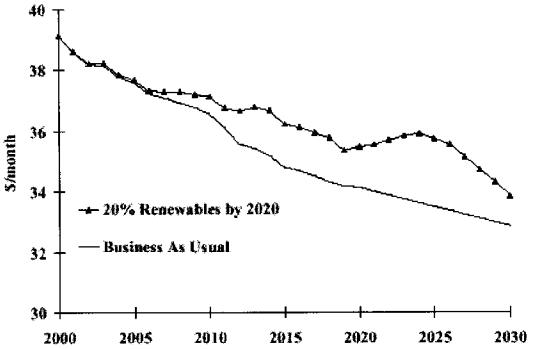


Figure 7. Average monthly electricity bill for typical nonelectric heating household



Source: Nogee, A., Clemmer, S., Paulos, B., and Haddad, B. (1999) "Powerful Solutions: 7 Ways to Switch America to Renewable Energy," Union of Concerned Scientists, January.

Figure 8. CHP growth potential within several sectors of the economy (ACEEE, 2001).

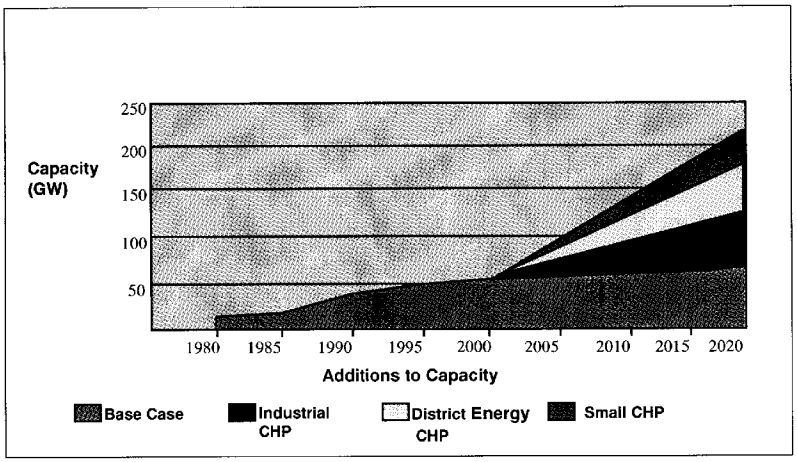


Figure 9. Electricity Deregulation under business as usual* (Clemmer, 2001)

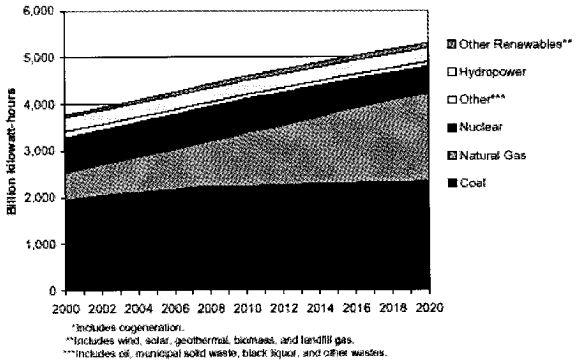


Figure 10. Energy generation with the implementation of various renewable energy and energy efficient policy options* (Clemmer, 2001)

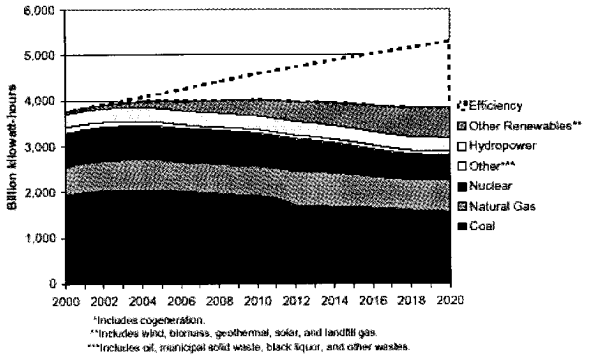


Figure 11. Power plant carbon dioxide emissions (Clemmer, 2001)

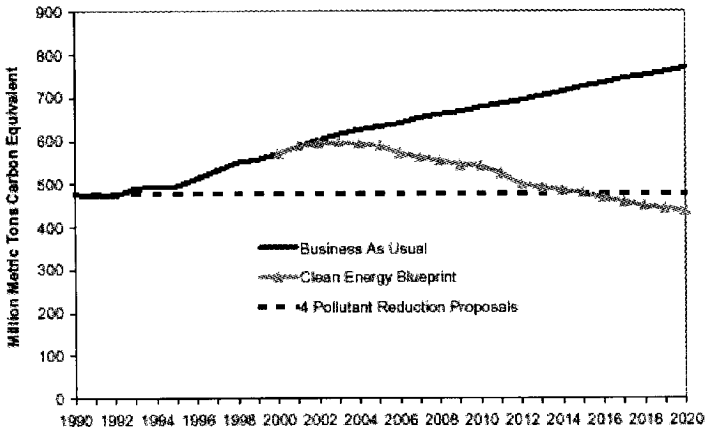
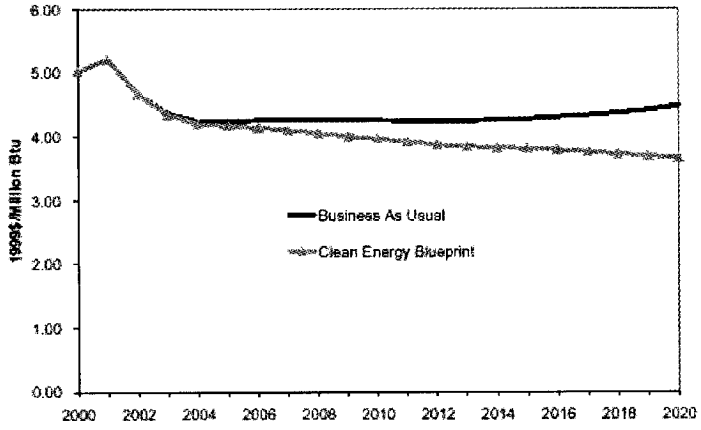
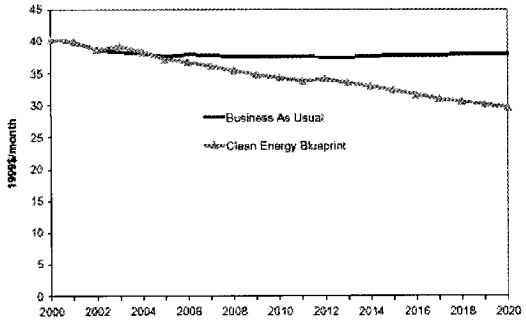


Figure 12. Natural gas prices (national average)* (Clemmer, 2001)



**In the AEO 2001 version of the National Energy Modeling System (NEMS), which was used for this analysis, the year 2000 is the first year of the forecast. Actual natural gas prices in 2000 were significantly higher than shown in the figure.*

Figure 13. Typical household electricity bill (Clemmer, 2001)



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[13] Established by the Windfall Profit Tax Act of 1980. Tax credit is $3 per barrel of oil equivalent produced, and phases out when the price of oil rises to $29.50 per barrel (1979 dollars)

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Response to a Question From Senator Bingaman

Question: Why we need a Federal Renewable Portfolio Standard?

Answer: A Renewable Portfolio Standard (RPS) is legislation which places an "obligation" on all sellers of power to the retail market to demonstrate through ownership of "renewable energy credits" that they have supported the production of a certain amount of electricity from qualifying renewable sources. These credits can come from either their own renewable power generating facilities, buying renewable power from other sources, or simply buying renewable energy credits. A renewable energy credit represents the environmental value of the kilowatt-hours generated from renewables, with the market price set through the flexible trading of these credits. The purpose of the RPS is to open the markets to clean energy production by ensuring the swift penetration of renewable energy into competitive electricity markets so as to bring down the costs until such a purchase obligation is no longer necessary.

An RPS has now been signed into law by at least 10 states: Arizona, Connecticut, Maine, Massachusetts, Nevada, New Jersey, New Mexico, Pennsylvania, Texas, and Wisconsin. Minnesota and Iowa also have a minimum renewables requirement similar to an RPS. Bills that include an RPS are pending in several other states. Senator Bingaman asked the very important question of why, if states around the country are already enacting an RPS, is there still a need for a federal RPS? Although 12 States is a good start it is difficult to determine how many will ultimately pass comprehensive and effective RPS laws. If the number of states remain small then the U.S. will ultimately miss or greatly delay the opportunity to build a sizable market for renewables. Only with a healthy and significant renewable energy market can this industry become commercially viable, so that we may all benefit from the energy security and environmental quality that renewable energy can provide.

A national market for clean energy will have a dramatic impact on driving down the costs of renewable energy technologies and moving these technologies fully into the marketplace. A patchwork of state policies would simply not be able to achieve this goal. In addition, state RPS policies have so far differed substantially from each other. This could cause significant market inefficiencies negating the cost savings that a more comprehensive, streamlined, market-based federal RPS package would give.

Second, not every state program is set up effectively. A successful RPS requires several critical components. These include:

- The obligation to buy renewables must apply equally to all sellers of electricity

- There must be a system of tradable renewable energy credits this will achieve the renewables goal at least cost
- Demand must outstrip supply by setting the obligation at either the level of existing renewables, increasing it from that point; or by excluding existing renewables; or by using separate tiers for existing and new renewables
- The obligation must rise gradually and predictably to ensure a stable market
- Stiff penalties must be imposed on market players that do not comply with the obligation to buy renewables; the penalty must significantly exceed the cost of compliance
- Requirements for new renewables should begin at least two years after all regulations are final to allow time for competition among all potential suppliers
- The RPS must be long term, continuing until renewable kWh prices drop to competitive market levels at which point the RPS will sunset
- Qualifying renewables must be limited to those that need market support (i.e., not large hydropower) and meet certain clean environmental criteria
- There must be flexibility for meeting the obligation, with a limited period for making up shortfalls, a system of credit banking, and an exemption provision for the case of extreme events.

If any of these above criteria are not properly detailed in RPS legislation then the program will likely be either ineffective or operate suboptimally [1]. To date, except for Texas, each of the states mentioned above have left out some number of these critical elements and consequently their RPS programs are not proving as successful as they should be at encouraging renewables growth. Such a track record is worrisome if an RPS is to promote the level of renewable energy growth that we need in this country to achieve a sustainable clean energy future.

It is for these reasons that I strongly recommend the implementation of a federal RPS that incorporates at a minimum all the elements listed above.

An RPS represents one of the best uses of true market forces, where policy sets the standard but economic competition is used to meet that target. The many economic, environmental, health, and social benefits of clean energy generation makes this a natural area for federal legislative action.

Please feel free to contact me should you wish to discuss this policy option at greater length.

PREPARED STATEMENT OF DANIEL A. LASHOF, PH.D.

Thank you Mr. Chairman and members of the committee. My name is Daniel Lashof, and I am the Science Director of the Natural Resources Defense Council's Climate Center. I appreciate the opportunity to appear before you today. My testimony will address tax incentives and other policies to reduce our nation's excessive dependence on petroleum.

The Natural Resources Defense Council (NRDC) is a national, non-profit organization of scientists, lawyers, and environmental specialists, dedicated to protecting public health and the environment. Founded in 1970, NRDC serves more than 500,000 members from offices in New York, Washington, Los Angeles, and San Francisco.

For over ten years I have been active on national energy policy issues. I was a coauthor of NRDC's recent report, *A Responsible Energy Policy for the 21st* Century, which I attach to this testimony for the record. I also served on the Energy Research and Development Panel of the Presidents' Committee of Advisers on Science and Technology, which produced a report to the President on *Federal Energy Research and Development for the Challenges of the Twenty-First Century*. Previously I served on the Federal Advisory Committee on Options for Reducing Greenhouse Gas Emissions from Personal Motor Vehicles. I hold a bachelor's degree in physics and mathematics from Harvard University and a doctorate in Energy and Resources from the University of California at Berkeley.

I. INCENTIVES SHOULD BE USED IN COMBINATION WITH OTHER POLICIES TO REDUCE PETROLEUM CONSUMPTION

During the last decade annual consumption of gasoline increased by 17 percent to 120 billion gallons in the year 2000. Despite various programs intended to promote alternative fuels the U.S. transportation sector remains 97 percent dependent on petroleum to meet its energy requirements. Largely as a result of these facts,

[1] Rader, Nancy (2000) "Getting it Right and Wrong in the States," *Windpower Monthly*, pages 42–47, April.

we now rely on imports to meet about half of our total demand for petroleum, and that share is expected increase to more than 60 percent over the next two decades.

The failure of U.S. energy and transportation policy to reduce demand for petroleum over the last decade has been extremely costly—both economically and environmentally. Last year U.S. consumers spent $186 billion on gasoline. Driven largely by this demand for gasoline, foreign oil suppliers drained $106 billion out of the U.S. economy. At the same time, petroleum combustion for transportation generated 20 million tons of smog-forming pollution (nitrogen oxides plus hydrocarbons) and 2.1 billion tons of global warming pollution (carbon dioxide). Meanwhile domestic oil production has industrialized formerly pristine wilderness areas, and pollutes the air and water locally. For example, the average offshore oil production platform generates more than 50 tons per year of nitrogen oxides, 11 tons of carbon monoxide, 8 tons of sulfur dioxide and 38 tons of volatile organic hydrocarbons per year.[1] In addition, according to MMS statistics, some *3 million gallons* of oil spilled from outer continental shelf oil and gas operations in 73 incidents between 1980 and 1999.[2]

It's folly to think that we can drill our way out of the energy problems we currently face. Oil is a global commodity whose price is determined primarily by international markets. This will continue to be true regardless of the level of domestic oil production. In other words, as long as U.S. oil markets remain open, the price of gasoline in Chicago, Detroit and Washington will fluctuate with global oil prices, even if the United States does not import any oil. Therefore, changes in domestic oil production would only affect oil prices to the extent that they influenced the global supply-demand balance. Given that the United States produces only about 12 percent of global petroleum supplies, even major changes in domestic production would have a marginal effect on global markets. Over the long term, the U.S. share of global production will inevitably decline further. The United States has less than 3 percent of world oil reserves, while Gulf state OPEC members control about two-thirds of proven reserves. Additional domestic drilling would not appreciably change this situation. For example, opening the coastal plain of the Arctic National Wildlife Refuge to oil exploration, would likely expand global oil reserves by just 0.3 percent.[3]

By contrast, the United States accounts for about 25 percent of world petroleum demand.[4] The obvious conclusion is that the United States can have a much greater impact on oil prices worldwide by cutting American demand than it can by trying to increase American supply. Indeed, untapped energy efficiency is in great supply, while untapped U.S. oil is increasingly rare, because most of America's accessible oil resources have already been exploited.

There are three basic approaches to reducing petroleum consumption in the transportation sector that should be promoted by public policy:

- Reduce the distance that people feel they need to drive by promoting smart growth and by providing convenient alternatives.
- Reduce the energy needed to travel a given distance by increasing vehicle fuel efficiency.
- Reduce the petroleum needed per unit of fuel consumed by increasing the use of environmentally-friendly alternative fuels.

Tax policy has an important role to play in advancing each of these goals. Tax policy will be most effective, however, as part of a comprehensive strategy that employs all of the following policy tools:

- Research on energy efficiency technologies and systems. Federally funded research plays a key role in creating a stream of economically attractive options.
- Targeted incentives for more efficient technologies and systems based on performance. Performance-based tax incentives can play a key role in commercializing advanced technologies by helping them cross the chasm, sometimes called the "valley of death," between research and development (often supported by direct federal expenditures), on the one hand, and commercial-scale mass production on the other.
- Efficiency standards, including higher Corporate Average Fuel Economy (CAFE) standards. Across-the-board codes and standards are critical for improving the overall performance of the vehicle (and buildings) fleet. These programs are the foundation of any cost-effective public policy for improving the energy efficiency

[1] MMS, 2000. Gulf of Mexico OCS Oil and Gas Lease Sale 181, Draft Environmental Impact Statement (DEIS), p. IV–40.

[2] *Id*., p. IV–50.

[3] Energy Information Administration, *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves*. 1999 Annual Report DOE/EIA–0216(99) (December 2000).

[4] Energy Information Administration.

of the U.S. economy. They are strongly complementary to targeted incentives, which help commercialize advanced technology that can contribute to achieving higher standards over time.

- Education and outreach on energy efficiency. Educational programs are needed to inform consumers about the choices that they have, and work best in conjunction with financial incentives.

Economic incentives have proven to be an effective policy for providing advances in energy efficiency technology and for making markets begin to work at supplying energy efficiency. Most of the effective incentives have been applied through the utility system; numerous third-party studies of these programs have shown that they typically have benefit/cost ratios of 2–1 or better.

Incentives have been even more effective at bringing major technological advances into the marketplace and getting them widely accepted. This process is called market transformation. Market transformation incentive programs tend to require longer lead-times and more consistent availability of funding. This is what manufacturers have asked for, and this is what has worked in the modest number of examples where programs have been implemented. The scope of such programs can be vastly expanded by adding programs that operate through the tax system.

II. THE ENERGY POLICY ACT WILL NOT ACHIEVE ITS GOALS

The ultimate goal of the alternative fuel vehicles provisions in the Energy Policy Act of 1992 (EPACT) was to "promote the replacement of petroleum motor fuels with replacement fuels to the maximum extent practicable."[5] The Act set a tentative goal of replacing at least 10 percent of the petroleum motor fuels projected to be used in 2000 and at least 30 percent of the petroleum motor fuels projected to be used in 2010.[6] In reality, alternative fuel use accounted for only 0.2 percent of motor fuel use in the year 2000. Total "replacement fuel" use amounted to 2.8 percent—less than one-third of the statutory goal—and this was primarily MTBE used to comply with the Clean Air Act's oxygen mandate. Unfortunately, the use of MTBE is contaminating groundwater nationwide and NRDC believes that its use should be capped and phased out as quickly as possible while maintaining the clean air benefits that it has contributed to. The Energy Information Administration (EIA) projects that alternative fuel use in 2010 (including use by EPACT and non-EPACT vehicles) will amount to 3.9 percent of gasoline use.[7] If MTBE is phased out by that time, total replacement fuel use is likely to be no more than about 6 percent of gasoline consumption—only one-fifth of EPACT's statutory goal. The goals of EPACT are not being achieved for three main reasons.

The goals of EPACT are not being achieved for three main reasons.

1. EPACT did not include policies to significantly improve the overall fuel efficiency of the vehicle fleet. As a result the overall fuel efficiency of the passenger vehicle fleet is now declining and gasoline consumption increased by 17 percent over the last decade. This increase in the total volume of gasoline consumption makes it more difficult for alternative fuels to make a given percentage contribution to the fuel supply.

2. EPACT did not include a comprehensive program to increase the availability of alternative fuels. The lack of infrastructure to deliver alternative fuels continues to constitute a chicken-or-egg barrier to their wider use.

3. The implementation of EPACT's alternative fuel vehicle fleet requirements has been incomplete at best. EPACT's primary approach to promoting alternative fuels was to require that government fleet vehicle purchases include an increasing percentage of vehicles capable of running on alternative fuels. Although most government agencies appear to be complying, they have done so largely through purchasing dual fuel capable vehicles that in fact run primarily on gasoline. EPACT also required the Department of Energy (DOE) to expand the fleet purchase requirements to private fleets if necessary to achieve the goals of Act. Although it is obvious that the alternative fuel use goals will not be met in the absence of greatly expanded use of alternative fuels by private fleet operators, DOE has not completed the required rulemaking. (See the appendix for a more complete review of the implementation of EPACT's alternative fuel provisions).

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[5] 42 U.S.C.A. § 13252(a). Replacement fuels include oxygenates (MTBE and ethanol in gasohol) and alternative fuels.

[6] 42 U.S.C.A. § 13252(b)(2).

[7] Department of Enegy, Office of Transportation Technologies, October 2000. Replacement Fuel and Alternative Fuel Vehicle Technical and Policy Analysis: Pursuant to Section 506 of the Energy Policy Act of 1992. Available at http://www.ccities.doe.gov/pdfs/section506.pdf. p. 33.

Taking a step back from evaluating EPACT's failure to achieve its specific goals for the use of alternative fuels, I believe that the goals themselves were off target. The use of alternative fuels should not be an end in itself. Rather, the goals for transportation policy should be to cost-effectively reduce overall petroleum consumption and the environmental and public health impacts of our excessive reliance on petroleum to fuel our mobility. Focusing only on alternative fuels and relying on limited requirements directed at vehicle fleet owners—as EPACT did—is a fundamentally inadequate response to the economic and environmental problems created by our current transportation system.

III. POLICIES TO REDUCE PETROLEUM DEPENDENCE AND PROTECT THE ENVIRONMENT AND PUBLIC HEALTH

A. Pass the CLEAR Act: Tax Incentives for Advanced Technology Vehicles and Alternative Fuels

The CLEAR Act (S. 760) provides a comprehensive set of performance-based tax incentives to accelerate the commercialization of advanced technology vehicles and alternative fuels. This bill is a major advance over previous vehicle tax credit proposals because it is the first proposal to link publicly-funded incentives directly to the public benefits provided by the vehicles that get the incentive, in this case the amount of petroleum and carbon dioxide displaced. This is accomplished by linking the amount of the tax credit it offers in part to the actual fuel economy of the qualifying vehicles. The bill also includes important provisions to ensure that public support only goes to truly advanced vehicles that reduce local air pollution as well as global warming pollution and petroleum consumption.

The policy advances incorporated into CLEAR reflect the collective advice of a unique coalition of environmental advocates and automakers. Public interest organizations that have joined NRDC in endorsing the CLEAR Act include the Union of Concerned Scientists, Environmental Defense, the American Council for an Energy-Efficient Economy, the Ecology Center of Ann Arbor, Michigan and the Michigan Environmental Council.

The performance based approach adopted in the CLEAR Act should also be applied to the design of tax incentives to promote efficiency in other energy using sectors of our economy. For example, "The Energy-efficient Buildings Incentives Act" (S. 207), introduced by Sens. Robert Smith and Diane Feinstein would provide tax breaks for building energy-efficient commercial buildings, schools, rental housing and new homes, cutting their energy needs by 30 percent to 50 percent. It also would provide tax incentives for the purchase of energy-efficient air conditioners, heating and cooling systems, and solar water heating and photovoltaic systems.

B. Establish Incentives to Promote Smart Growth Development Patterns

Gasoline use also can be reduced by directing real estate development away from urban sprawl and toward "smart growth." Smart-growth suburbs reduce the need to drive by 30 percent or more, cutting household expenditures on transportation.[8] An important incentive for smart growth is to establish mortgage qualification rules that recognize the increased affordability of homes that have low transportation costs because they are located in areas with good access to public transportation.

C. Modify the Ethanol Tax Credit to Make it Performance-Based

The largest incentive currently going to alternative fuels is the excise tax credit provided for ethanol. Unfortunately, the environmental benefits generated by this tax credit are ambiguous because it does not currently incorporate performance criteria. Most ethanol is currently produced from corn and requires high levels of chemical and fossil fuel inputs that are similar to those for conventional gasoline over the full fuel cycle of production and use. The existing tax incentive for ethanol could be reformed by linking the amount of the credit to the net reduction in global warming pollution or fossil fuel consumption achieved by the ethanol producer. This would encourage ethanol producers to shift to less energy intensive feedstocks, such as agricultural wastes and perennial crops, and to improve the efficiency of their conversion processes.

D. Close the Light Truck Loophole and Raise Fuel Economy Standards to 40 Miles per Gallon

Incentives for advanced technology vehicles will be most effective if enacted in combination with updated fuel economy standards. This can be accomplished in two steps. First, congress should quickly eliminate the light truck loophole in the cur-

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[8] David Goldstein, "Mortgages Can Remove the Incentive for Sprawl," *Earthword: The Journal of Environmental and Social Responsibility*, Issue #4.

rent fuel economy standards. The share of new vehicles that are classified as light trucks (SUVs, minivans, and pickups) has increased dramatically from 20 percent of sales when the CAFE law was first enacted in 1975 to nearly 50 percent of the market today. Yet the vast majority of vehicles currently regulated as light trucks are in fact used in exactly the same way as passenger cars. EPA recognized the need to eliminate the light truck loophole in its Tier II tailpipe standards beginning in 2004. Congress should follow this lead and eliminate the light truck loophole in fuel economy regulations in the same time frame. Congress should steadily raise the overall fuel economy standard for the entire light vehicle fleet over a longer time period. A recent report by the Union of Concerned Scientists shows that the combined passenger fleet average efficiency could be increased to 40 miles per gallon (mpg) by 2012 and at least 55 miles per gallon by 2020. The 40 mpg standard could be achieved through incremental improvements to vehicles with conventional drive trains, although hybrid vehicles would likely contribute to achieving this efficiency level. The 55 mpg standard could be achieved by applying hybrid technology more extensively along with further improvements in streamlining, mass reduction, plus tire and accessory efficiency.[9]

Congress should also set standards for replacement tires. It is a little known fact that auto manufacturers use highly-efficient tires to comply with current CAFE requirements, but comparable tires are not available to the consumers as replacements. Congress should require replacement tires to meet the same specifications as those sold on new cars. This measure alone would save over 70% more oil than is likely to be found if drilling were permitted in the Arctic National Wildlife Refuge.

IV. BENEFITS OF A COMPREHENSIVE POLICIES TO PROMOTE ADVANCED TECHNOLOGY VEHICLES AND ALTERNATIVE FUELS

The economic and environmental benefits of enacting the comprehensive set of policies described here would be profound. The Environmental Protection Agency (EPA) estimates that the average light truck on the road today produces 164 pounds of smog-forming pollution (hydrocarbons plus nitrogen oxides) and 8.0 tons of global warming pollution in traveling 14,000 miles each year. This does not include upstream emissions associated with producing the fuel, which would add about 11 pounds of smog-forming pollution and 2 tons of global warming pollution, bringing the totals to 175 pounds of smog-forming pollution and 10 tons of global warming pollution. A conventional new vehicle is substantially cleaner than this average with respect to smog-forming pollution, but has roughly the same fuel economy and therefore the same global warming pollution emissions as the existing vehicle it is likely to replace. For example, a vehicle meeting the National Low Emission Vehicle standard would emit only 12 pounds of smog-forming pollution from its tailpipe, but upstream emissions would still add 11 pounds, bringing its total impact to 23 pounds of smog-forming pollution and 10 tons of global warming pollution. In contrast, a hybrid vehicle qualifying for a $3000 tax credit under the CLEAR Act would emit less than 1 pound of smog-forming pollution from its tailpipe and would use only half as much fuel. As a result, its total impact would be only 6 pounds of smog-forming pollution and 5 tons of global warming pollution. (See table 1).

Aggregating from emission reductions from individual vehicles to emission reductions for the passenger vehicle fleet as a whole, the Union of Concerned Scientist (UCS) estimates that the combination of tax incentives and higher fuel economy standards advocated here would save 540 million barrels of oil in the year 2010, reduce upstream smog-forming pollution by 320 million pounds, and reduce global warming pollution by 273 million tons. By 2020 the savings would be even more dramatic: 1.8 billion barrels of oil, 1000 pounds of smog-forming pollution, and 890 million tons of global warming pollution. All of these benefits would be achieved while saving consumers billions of dollars: nearly $10 billion in 2010 and $28 billion in 2020 according to UCS.

In conclusion, appropriate federal policies can dramatically improve the economic and environmental performance of our transportation system. Tax incentives can play an important role in achieving this result, in combination with updated fuel economy standards, investments in research and development and effective consumer education programs. In particular, I believe that this committee should consider favorably the approach taken by the CLEAR Act, which ties incentives to environmental performance.

Thank you for your consideration.

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[9] Union of Concerned Scientists, *Drilling in Detroit: Tapping Automaker Ingenuity to Build Safe and Efficient Automobiles*. (June 2001). Available from http://www.ucsusa.org/

Table 1. Annual Emissions per Vehicle (based on 14,000 miles per year)

	Average Light Truck	*New NLEV*	*Hybrid*
Smog Total (pounds HC + NOx)	**175**	**23**	**6**
Tailpipe	164	12	1
Upstream	11	11	5
Global Warming Total (tons carbon dioxide)	**10**	**10**	**5**
Tailpipe	8	8	4
Upstream	2	2	1

Appendix. Implementation of the Alternative Fuels Provisions of EPACT

The ultimate goal of the alternative fuel vehicles provisions in the Energy Policy Act of 1992 (EPACT) was to "promote the replacement of petroleum motor fuels with replacement fuels to the maximum extent practicable."[10] The Act set a tentative goal of replacing at least 10 percent of the petroleum motor fuels projected to be used in 2000 and at least 30 percent of the petroleum motor fuels projected to be used in 2010.[11] The main means that the Act provided to achieve those goals were alternative fuel vehicle (AFV) acquisition mandates. The Act also authorized various incentive and educational programs.

The mandates likely were not intended to achieve the petroleum fuel replacement goals by themselves. However, the mandates have largely failed to achieve even the more modest goal of spurring more private AFV purchases by helping to achieve economies of scale in the production of AFVs and the provision of alternative fuels. Recent analyses by GAO and DOE have highlighted these failures and the shortcomings in existing policies that caused them.

A. EPACT's AFV Provisions and DOE's Implementation Measures

(1) Mandated acquisitions of alternative fuel vehicles for federal government fleets

EPACT requires each federal fleet to ensure that alternative fuel vehicles comprise a specified percentage of the total number of vehicles it purchases in a given year.[12] The annual AFV acquisition mandates are: 25 percent in 1996, 33 percent in 1997, 50 percent in 1998, and 75 percent in 1999 and every year thereafter. The Secretary can reallocate the required AFV purchases across fleets as long as the percentage goal is met in aggregate.[13]

Initially, there were no enforcement or reporting requirements in the federal program. However, under the Energy Conservation Reauthorization Act of 1998 (ECRA) all federal agencies subject to EPACT AFV purchase requirements must prepare and submit an annual report to Congress stating whether the agency is meeting its AFV purchase requirements, and, if not, how it intends to meet them.[14]

In April, 2000, President Clinton bolstered the effect of EPACT's federal AFV acquisition requirements by issuing Executive Order 13149. The Order mandates each federal agency operating a fleet of 20 or more vehicles to reduce its annual petroleum fuel consumption by 20 percent below FY 1999 levels by FY 2005. The Order also requires agencies to meet their AFV acquisition targets and to use alternative fuels to meet the majority of the fuel requirements of those motor vehicles by the end of FY 2005. Finally, it mandates modest improvements in overall fuel efficiency of federal fleets by 2005.

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[10] 42 U.S.C.A. § 13252(a). Replacement fuels include oxygenates (MTBE and ethanol in gasohol) and alternative fuels.

[11] 42 U.S.C.A. § 13252(b)(2).

[12] 42 U.S.C.A. § 13212(b)(1). The requirement does not apply to fleets of certain types of vehicles, such as emergency vehicles, enforcement vehicles, and vehicles held for lease or rental to the public. 42 U.S.C.A. § 13212(b)(3).

[13] 42 U.S.C.A. § 13212(b)(2).

[14] 42 U.S.C.A. § 13218(b).

(2) Mandated AFV acquisitions for state government fleets and alternative fuel providers

EPACT also establishes AFV acquisition requirements for state fleets and alternative fuel providers.[15] DOE implemented those provisions in 1996.[16] Under the regulations, certain alternative fuel vehicle providers must ensure that 90 percent of the new vehicles that they acquire be alternatively fueled by 2000; and state government fleets must ensure that 75 percent of the vehicles that they acquire each year are alternatively fueled by 2001.

DOE's implementing regulations also establish a marketable credit program. Under the program, regulated entities that voluntarily acquire vehicles in excess of mandated requirements or before the requirements take effect can obtain credit from DOE for the "excess" or early AFV purchases, and can transfer the credit to other regulated parties. Those parties can then use the credits to demonstrate compliance with the AFV acquisition requirements. Such a program is authorized by 42 U.S.C.A. § 13258.

Finally, the regulations for state fleets and alternative fuel providers include reporting requirements and enforcement provisions. The enforcement provisions would also apply to mandates for private and municipal fleets, should DOE establish those mandates.

(3) AFV acquisition requirements for private and municipal fleets

EPACT also established a tentative AFV acquisition schedule for private and municipal fleets.[17] The tentative schedule could take effect only if DOE confirms it in a rule; and the Act gives DOE the discretion to impose less stringent acquisition mandates or to conclude that it is not appropriate to impose the requirements at all. In 1997, DOE determined that it would not promulgate regulations to implement alternative fueled vehicle requirements for certain private and local government fleets according to § 13257(a)(1).[18] However, another EPACT provision requires DOE to establish such a program should it prove necessary to achieve the Act's petroleum fuel replacement goals.[19] In 1998, DOE held hearings on whether it needs to establish such a program to meet the petroleum fuel replacement goals.[20] In 2000, DOE first extended its rulemaking deadline and then paused its rulemaking effort to complete a consultation process.[21] The agency has not yet issued a final decision.

(4) Other programs

ECRA also established a biodiesel fuel use credit program.[22] Under the program, fleets or individuals subject to AFV acquisition requirements can obtain credit from DOE for using specified amounts of biodiesel fuel in conventional, heavy duty vehicles. The biodiesel fuel use credits then count toward the AFV acquisition requirements for the fleet. DOE implemented the credit program in 1999.[23]

To help meet EPACT's petroleum fuel replacement goals, DOE has also implemented the Clean Cities Program. The program establishes local, public-private partnerships to "develop local plans for creating an alternative fuels market."[24] By mid-1999, the Clean Cities Program had created partnerships in 72 cities; and participating fleet operators within those Clean City Programs are operating or planning to be operating over 200,000 AFVs by 2003.[25]

Finally, DOE has established various education programs, incentive programs, recognition programs, grant programs and low-interest loan programs to help federal and state agencies fulfill the Act's goals. These programs do not impose additional requirements, however.

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[15] 42 U.S.C.A. §§ 13251 and 13257(o). Alternative fuel providers are defined as businesses that are involved in (1) producing, refining, storing, processing, transporting, distributing, importing, or selling at the wholesale or retail level alternative fuels other than electricity; (2) generating, transmitting, importing, or selling wholesale or retail electricity; or (3) producing or importing an average of 50,000 barrels per day of petroleum.

[16] 61 Fed. Reg. 10622.

[17] 42 U.S.C.A. § 13257(a).

[18] 62 Fed. Reg. 19701.

[19] 42 U.S.C.A. § 13257(g).

[20] 63 Fed. Reg. 19372.

[21] 65 Fed. Reg. 1831; 65 Fed. Reg. 44987.

[22] 42 U.S.C.A. § 13220.

[23] 64 Fed. Reg. 27169.

[24] Department of Energy, Office of Transportation Technologies. October 2000. *Replacement Fuel and Alternative Fuel Vehicle Technical and Policy Analysis: Pursuant to Section 506 of the Energy Policy Act of 1992*. Available at http://www.ccities.doe.gov/pdfs/section506.pdf (hereinafter DOE).

[25] DOE at 24.

B. Effectiveness of the Mandatory AFV Acquisition Provisions

The actual replacement of petroleum motor fuels has fallen well below EPACT's 10 percent goal for 2000. The total use of replacement and alternative fuels as a percentage of gas and diesel fuel use is shown in Table 2.

Table 2: Estimated Use of Conventional and Replacement Vehicle Fuels in the U.S., 1997-2001[26]
(Thousand Gasoline-Equivalent Gallons)

	1997	1998	1999	2000	2001 (projected)
Total alternative fuel use	312,589	324,826	339,340	353,760	366,331
Total replacement fuel use (including oxygenates)	4,117,726	4,117,726	4,627,240	4,469,760	4,369,831
Total gasoline and diesel use (excluding oxygenates)	147,037,781	152,721,460	156,619,900	157,314,340	159,861,510
Alternative fuel use as a percentage of gas and diesel use	0.21	0.21	0.22	0.22	0.23
Replacement fuel use as a percentage of gas and diesel use	2.80	2.70	2.95	2.84	2.73

Substantial, additional measures are clearly needed if EPACT's 30 percent petroleum fuel replacement goal is to be achieved by 2010. EIA projects that alternative fuel use in 2010 (including use by EPACT and non-EPACT vehicles) will amount to 3.9 percent of gasoline use, and that total replacement fuel use in 2010 would amount to 7 to 8 percent of total gasoline use if the Clean Air Act oxygenate mandate remains unchanged.[27]

Although the use of alternative fuels as a percentage of total motor fuel use has not increased recently, the number of alternative fuel vehicles has risen steadily. The number of AFVs used by the federal government has increased from 18,500 in 1997 to 24,007 in 1999, and is expected to reach 35,002 in 2001.[28] The number of AFVs in use by state and local governments increased from 85,355 in 1997 to 101,485 in 1999, and is expected to reach 116,342 in 2001.[29]

Despite those positive trends, it is not clear whether EPACT's AFV acquisition mandates are being fulfilled. DOE does not have a complete inventory of all fleets for each group that are subject to the mandates; and the agency does not audit or survey the groups to fill that information gap.[30] DOE is least certain about the level of compliance among alternative fuel providers. It is fairly clear that the federal government met its acquisition goal in 1998, and DOE believes that most state fleets are in compliance.[31] Even if full compliance were achieved and the local and private fleet mandates were put in place, however, alternative fuel use by EPACT-mandated fleets would account for no more than about 1.5 percent of all replacement fuel use.[32]

C. Reasons for Failure

The AFV acquisition mandates by themselves likely were never intended to achieve the petroleum fuel replacement goals. Instead, the mandates were intended to spur private purchases by making AFVs more familiar and by helping to achieve economies of scale in vehicle production and alternative fuel provision. By DOE's

[27] DOE at 33.
[28] EIA, Table 9.
[29] EIA, Table 8.
[30] General Accounting Office, February 2000. *Energy Policy Act of 1992: Limited Progress in Acquiring Alternative Fuel Vehicles and Reaching Fuel Goals*. GAO/RCED–00–59. *Available at* http://www.access.gpo.gov/su—docs/aces/aces160.shtml.
[31] GAO at 9–10.
[32] DOE at 35.

own admission, however, the programs have failed to fulfill even those goals.[33] The main reasons for the failures are outlined below. As discussed in Section I of this appendix, some of these problems were addressed by Executive Order 13149. The Order did not significantly address infrastructure problems, however; and it reached only the AFV provisions concerning the federal government.

A lack of refueling stations providing alternative fuels has hindered the use of those fuels. GAO noted that state and federal officials regard the lack of refueling stations as the single greatest barrier to the increased use of alternative fuels. Owners of refueling stations cite the lack of demand for alternative fuels and the high cost of providing some alternative fuels (like CNG) at refueling stations as the main barriers that they face. DOE recently estimated that 60,000 to 69,300 refueling stations for alternative fuels—more than 10 times the number that were available in 1999—are needed to meet the Act's 30 percent reduction goal for 2010.[34]

The higher relative cost of alternative fuel vehicles remains a barrier to widespread AFV purchases. The purchase price of many types of AFVs is substantially higher than that of comparable, conventional vehicles. CNG vehicles typically cost $3,000 to $5,000 more than their conventional counterparts, and electric vehicles start in the $30,000s.[35] In addition, the low price of gasoline contributes to the higher life-cycle cost of AFVs to vehicle owners. Alternative fuels often are more expensive, particularly if the additional time required to reach a refueling station is taken into account.[36]

There are mismatches between the Energy Policy Act's goals and the nature of its mandates. Although the Act's goal is to replace petroleum fuel use with alternative fuel use, it mandates only the acquisition of vehicles that can use alternative fuels rather than the actual use of alternative fuels. Since the law does not require otherwise, many alternative fuel vehicles are run on gasoline. Fleet managers cite the lack of refueling stations and safety concerns as reasons for making this choice.[37]

Alternative fuel use targets are not the only provisions missing from the Act. The goal of replacing a certain proportion of the petroleum fuels used with alternative fuels can be furthered both by increasing the absolute amount of alternative fuel used and by reducing the total amount of petroleum fuels used. As the numbers in Table 2 suggest, the lack of progress in meeting petroleum fuel replacement goals has been driven in part by steady, significant increases in the total use of gasoline and diesel fuel. Yet the Act does not mandate purchases of highly efficient vehicles or other measures that would encourage regulated fleets to increase their fuel efficiency.

The EPACT programs are too small to overcome infrastructure and economic barriers to alternative fuel use. As noted above, DOE estimates that alternative fuel use by EPACT-mandated fleets would account for no more than about 1.5 percent of replacement fuel use, even if mandates for private and local government were put in place. Even if federal agencies, state governments, and alternative fuel providers fully complied with EPACT's AFV acquisition requirements, their use of replacement fuels would amount to only about 1 percent of petroleum fuels in 2010.[38] EPACT's AFV acquisition mandates have had at best a marginal effect on the replacement of petroleum fuels. Recent experience suggests that the mandates' effect is likely to remain marginal in the absence of broader measures to address the infrastructure and economic barriers to the increased use of AFVs and alternative fuels.

PREPARED STATEMENT OF HON. HARRY REID

I thank Chairman Baucus and Senator Grassley for holding hearings onenergy tax incentives. This is an important and timely hearing. Our nation needs a comprehensive and responsible energy strategy which encompasses conservation, efficiency, and an expanded generating capacity with an emphasis on renewable energy sources. On February 6, 2001, I introduced S. 249, the *Renewable Energy Development Incentives (REDI) Act*. S. 249 expands the currently limited production tax credit, which has fueled a boom in new wind energy development, to include environmentally-preferred renewable energy sources such as geothermal, solar, biomass, and incremental hydropower. I urge the support of tax incentives for renewable en-

[33] DOE at 20.
[34] GAO at 13.
[35] GAO at 16.
[36] GAO at 12.
[37] GAO at 16–17.
[38] GAO at 10.

ergy technologies—for the energy security of the United States, for the protection of our environment, and for the health of the American people.

Additionally, by making the production tax credit permanent, my legislation signals America's long-term commitment to renewable energy resources and provides the needed business certainty for utilities to invest in renewable energy sources. My legislation (1) provides a credit for renewable energy production on native American and Alaskan Native lands; (2) provides a co-production credit to encourage blending of renewable energy with other production processes; and (3) provides a production incentive to tax exempt energy production facilities (e.g., public power utilities) by allowing them to transfer their credits to taxable entities. My bill also allows the credit to offset the alternative minimum tax—ensuring that smaller producers can benefit from this tax incentive.

Renewable energy is poised to make major contributions to our Nation's energy needs over the next decade. The Department of Energy has estimated that we could increase our generation of geothermal energy almost ten fold, supplying ten percent of the energy needs of the West, and expand wind energy production to serve the electricity needs of ten million homes. My home state of Nevada is sometimes referred to as the "Saudi Arabia of Geothermal Energy." Nevada has already developed 230 Megawatts of geothermal power, with a longer-term potential of more than 2,500 Megawatts, enough capacity to meet half of the state's present energy needs. As fantastic as it sounds, enough sunlight falls on a 100 mile-by-100 mile area of southern Nevada that—if covered with solar panels—could power the *entire* nation.

Hopefully, the Nevada Test Site will soon be home to a state-of-the-art wind farm supplying 260 Megawatts to meet the energy needs of 260,000 homes. However, this wind-farm project is experiencing delays in securing loans from banks due to the uncertain nature of the production tax credit for wind energy. Once again, we must make the tax credit permanent to send the signal to utilities that we are committed, for the long term, to the growth of renewable energy.

Encouraging growth in the renewable energy industry in the United States will also provide employment opportunities, and help the United States compete in world markets. In states like Nevada, expanded renewable energy production will provide jobs in rural areas—areas that have been largely left out of America's recent economic growth.

The United States needs to move away from its dependence on fossils fuels that pollute the environment and undermine our national security interests and balance of trade. Ensuring that the lights and heat stay on is absolutely critical to sustaining America's economic growth and Americans' quality of life. Renewable energy—as an alternative to traditional energy sources—is a common sense way to ensure the American people have a reliable source of power at an affordable price. Enactment of S. 249 is critical to increasing the supply of renewable energy for the American people.

PREPARED STATEMENT OF HON. JOHN D. ROCKEFELLER IV

I am unable to attend this morning's hearing on the role of tax incentives in the formulation of our national energy policy because I have returned to West Virginia to survey the severe flood damage in the southern and central parts of my state. I very much wanted to be here for this hearing, because I strongly support the concept of using tax incentives to develop and promote alternative sources of energy, and to hasten commercial development of alternative fuel vehicles. I applaud Chairman Baucus' willingness to tackle this important issue so early in his Chairmanship. I believe it is absolutely imperative that our nation have a comprehensive energy policy, and I view the use of tax incentives to promote fuel diversity and a cleaner environment as an essential and responsible part of any such policy.

As the Chairman and many others in this room know, I have been keenly interested in expanding the availability and usage of alternative fuels since I came to the U.S. Senate. Earlier this year, I joined our Finance Committee colleagues, Senators Hatch, Jeffords, and Kerry, as original cosponsors of the CLEAR ACT, which would greatly increase the concentration of alternative fuel vehicles on our highways, clearing the air at the same time as it lessens our dependence on foreign petroleum imports.

Recent events have made the alternative fuels issue even more compelling. The evening news reminds us nearly every day that the country may be perched on the brink of an energy crisis, and with gasoline prices this summer having reached the $2 per gallon plateau, the issue of fuel diversity and its importance to our nation's energy security may never again seem so basic and undeniable. This issue is particularly critical to places like my home state of West Virginia, where there is little

or no public transportation, and where nearly everyone must drive, often considerable distances, to work, school, and to seek medical care.

Stimulating the development and use of alternative fuels is also critical from an environmental perspective. Smog is a major problem for many of our nation's metropolitan areas, and the process of global warming continues unabated. Indeed, most of the urban areas in nonattainment for ground-level ozone are in that status because of automobile emissions. In this regard, I would refer my colleagues to an article from this past Sunday's *Washington Post* regarding the likelihood that the National Capital area will exceed pollution limits for automobile emissions this summer, largely because of SUV emissions, with the potential for serious negative impact on public health. By linking maximum tax incentives with dramatic improvements in vehicle efficiency and emission reductions, my fellow CLEAR ACT sponsors and I hope to bring about a significant improvement of air quality throughout the country.

Using the tax code to develop new infrastructure and to encourage consumers to try new things has traditionally been very effective, and in this case, it is vital. For too long, we have been caught in a "chicken and egg" cycle, with the infrastructure not available to support alternative fuel vehicles, and consumers not interested in the vehicles because there is no support infrastructure. We can break this cycle by creating tax incentives that keep alternative fuels affordable and help develop the necessary infrastructure. If consumers see affordable new fuels available at their local gas stations, they will be much more likely to want to use an alternative fuel vehicle. While changing consumer behavior is not easy, I am confident that if people see that alternative fuels are available, they will soon begin to use them.

In conclusion, I believe very strongly that the nation will benefit from the types of tax incentives we are discussing here today. This is not a partisan issue. I believe it is a very responsible use of the tax code to bring about the kind of positive changes envisioned by legislation like the CLEAR ACT. Alternative fuels and alternative fuel vehicles must play a role in our future national energy strategy, and I hope the President will recognize this and support these types of incentives. I look forward to working with the Chairman and my fellow CLEAR ACT cosponsors as the tax pieces of the national energy policy are formulated.

PREPARED STATEMENT OF T. PETER RUANE

Introduction

Good morning, Mr. Chairman and members of the Committee. I am Pete Ruane, president and chief executive officer of the American Road & Transportation Builders Association (ARTBA), which is based here in Washington, D.C.

ARTBA, which will celebrate its 100th anniversary next year, has over 5,000 member firms and member public agencies from across the nation. They belong to ARTBA because they support strong federal investment in transportation improvement programs to meet the needs and demands of the American public and business community. The industry we represent generates more than $185 million annually in U.S. economic activity and sustains 2.2 million American jobs.

At the outset, I would like to thank Chairman Baucus for giving our industry an opportunity to testify at this important hearing. Your understanding of, and long time support for, transportation improvement programs and investment is deeply appreciated by the transportation and construction communities.

As context for my remarks, you should know that ARTBA believes the U.S. highway program must emphasize five principles:

1. Highway capital improvements should be financed primarily through the collection of highway user fees. And these fees, which should be levied and collected by government, must be adjusted as necessary to provide an adequate source of funding for the highway, bridge and mass transit improvement program.
2. Safety must be a paramount concern in the design, construction, maintenance and traffic operations of the nation's highway system.
3. Critically deficient bridges should be repaired or replaced.
4. Improved rideability and pavement durability should be program goals; and
5. The capacity and efficiency of the highway system should be improved as necessary to meet public demand and the needs of the economy.

In line with our support for the user-fee concept of financing surface transportation improvements, we also believe all energy sources utilized to power motor vehicles that use the nation's highway and bridge system should be taxed to pay for system improvements through the federal Highway Trust Fund. The current investment needs of our highway system dictates that the excise on such motor vehicle powering sources should be at least equivalent to that currently levied on gasoline.

These views are supported by virtually all state and national organizations representing highway transportation and construction concerns.

The Tax Nexus Between Federal Transportation, Energy, Environmental Policies

My primary purpose today is to bring to your attention the unique nexus between federal transportation, energy and environmental policies. Policy in all three areas have a common thread—the use of federal tax law involving motor fuels to advance national objectives.

Unfortunately, these tax policies are often debated and decided separately and thus in a vacuum—during a transportation bill . . . an energy bill . . . or an environmental bill. As a result, positive impacts for one policy area sometimes contradict—or even undermine—goals and objectives in another policy area.

The federal government first levied a highway user fee on the sale of motor fuels in 1956, when it established the federal Highway Trust Fund. The original congressional intent in establishing the user fee—an excise on gasoline and diesel fuel—is clear: to ensure that America would have a "pay-as-you-go" system for funding needed highway and bridge improvements.

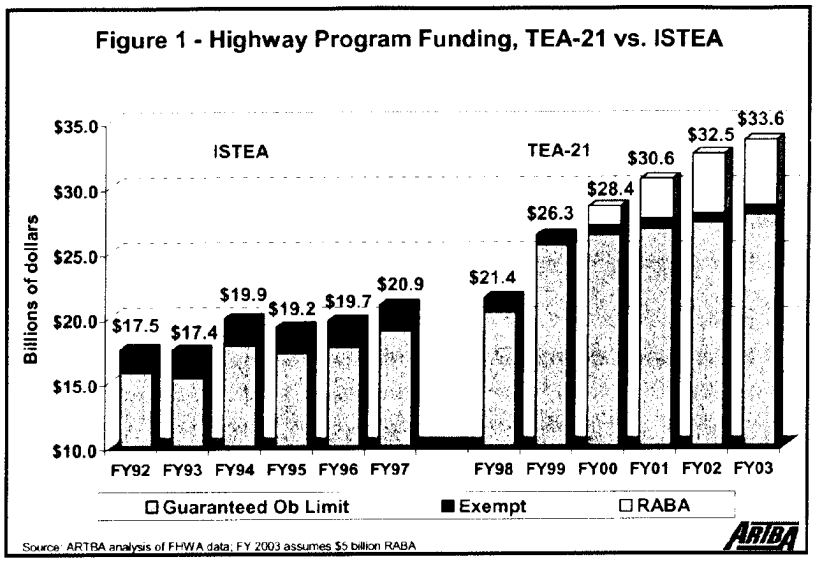
The principle was—and remains today—that the more you drive, or use the roads, the more you pay to build and maintain them.

This user fee principle was reaffirmed by the Congress in 1998 with the enactment of the Transportation Equity Act for the 21st Century, or TEA–21.

Unfortunately, current public investment in road, bridge and mass transit improvements financed by highway user fees levied at all levels of government is not sufficient to maintain the physical conditions of the system, much less improve its overall performance for the American public and business community.

Status of the Nation's Highway Network

Under the landmark TEA–21, federal highway investment will have averaged just under $29 billion per year by the time the program expires in 2003. This represents a substantial increase over the funding provided under the Intermodal Transportation Efficiency Act of 1991 (ISTEA), as Figure 1 demonstrates.

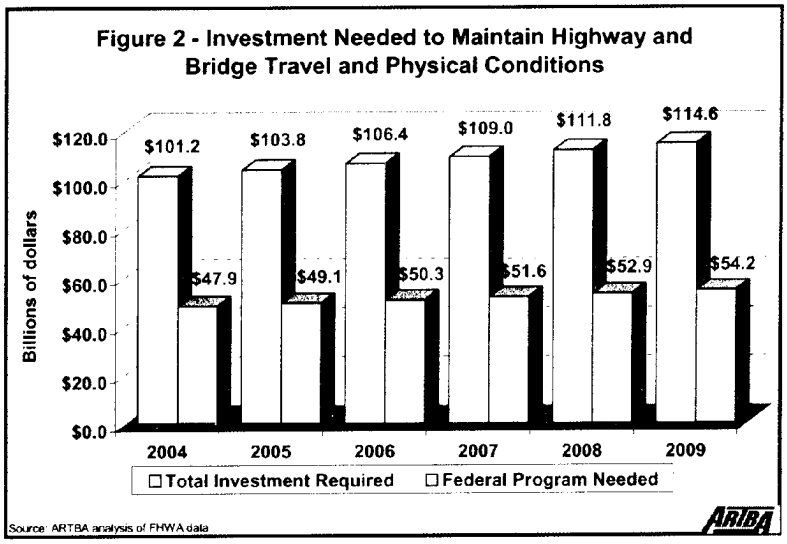


Under TEA–21, however, investment by government at all levels has barely been enough to maintain the physical condition of the nation's highways and bridges, according to the U.S. Department of Transportation's (U.S. DOT) 1999 biennial report on the condition and performance of the nation's highways, bridges and transit systems. Worse, investment has fallen far short of the amount needed to maintain travel times and prevent traffic congestion from increasing, which are of equal, if not greater, importance to highway users.

While the nation's roadway and bridge network has benefited from increased investment over the past decade, the system still has enormous, unmet capital needs. The 1999 U.S. DOT report articulates the following challenges that must be addressed:

- **Twenty-eight percent of all arterial road miles in the U.S. are in "poor" or "mediocre" condition.** The situation is worst on the nation's heavily traveled urban interstates, where 36 percent of the pavement mileage is classified as in "poor" or "mediocre" condition.
- **Thirty percent—172,572 U.S. bridges—are either "structurally deficient" or "functionally obsolete."** That includes more than one out of every four bridges (27 percent) on urban interstates.
- And highway congestion is a growing concern. **Fifty-three percent of urban interstate highway miles are congested during the peak travel hour.** In the nation's 68 largest urbanized areas, 64 percent of all travel occurs in "moderate" to "extreme" traffic congestion, compared to only 35 percent in 1982. **This congestion costs the U.S. economy more than $78 billion each year,** more than triple the $22 billion cost in 1982. Perhaps even more distressing is the cost traffic congestion is imposing on the quality of life for American families.

Based on data published in the U.S. DOT report, adjusted to reflect historic levels of traffic growth and OMB's estimate for future inflation, the minimum level of investment required by all levels of government in 2004, the first year of TEA–21's successor legislation, to simply maintain both the current physical condition and performance of the nation's highway and bridge system, would be $101.2 billion. This is more than $40 billion more than the $59.5 billion that was actually spent in 1999 by all levels of government combined. By 2009, the necessary investment would grow to $114.6 billion. The annual figures are shown in Figure 2.



Today, the federal government funds almost 45 percent of all state and local capital investments in road and bridge improvements. The 1999 U.S. DOT report to Congress, therefore, suggests that **a $50 billion per year federal highway program is necessary just to maintain the system conditions and performance levels detailed above** over the period 2004–2009, which is the expected duration of the next federal surface transportation authorization bill. This is $17 billion per year more than the expected federal highway investment in 2003. The annual figures for these investment requirements are also shown in Figure 2. **To actually improve highway and bridge system conditions and performance, the U.S. DOT report suggests a $65 billion per year federal highway program would be necessary.**

Promoting Alternative Fuels and the Highway Trust Fund

Clearly the intent of Congress in enacting TEA–21 was to make surface transportation investment a federal priority. But you should be aware as the Congress discusses and debates a new federal energy policy in the weeks ahead that some current federal energy and tax policies work against the goals of TEA–21.

For example, the purpose of the Energy Policy Act of 1992 (EPAct) was to accelerate the use of alternative motor fuels in the transportation sector—certainly a laudable goal from energy independence and perhaps even environmental standpoints. EPAct's stated goal is to replace 30 percent of petroleum-based motor fuels by the year 2010.

EPAct defines as an alternative motor fuel the following: methanol and denatured ethanol as alcohol fuels (alcohol mixtures that contain no less than 70 percent of the alcohol fuel), natural gas (compressed or liquefied), liquefied petroleum gas, hydrogen, coal-derived liquid fuels, fuels derived from biological materials and electricity (including solar energy). Under the law, the U.S. Department of Energy can expand this list when new fuels are developed.

What impact would reaching such a laudable goal have on federal funding for highway and mass transit improvements? If the motor fuel sources are not taxed equivalently to gasoline, *the impact would be devastating to highway and mass transit programs in all states*!

Consider the impact of the current federal tax treatment of ethanol-gasoline motor fuel blend sales. And I must make clear ARTBA has no brief against the promotion and use of ethanol as a motor fuel beyond the way it impacts the Highway Trust Fund.

Current Federal Tax Treatment of Alternative Fuels

A motorist purchasing gasoline contributes 18.3 cents per gallon to the Highway Trust Fund through the federal user fee—15.44 cents per gallon to the trust fund's Highway Account and 2.86 cents per gallon to the fund's Mass Transit Account. (An additional 0.1 cents per gallon is contributed to the Leaking Underground Storage Tank Trust Fund.)

Under current federal law, a motorist purchasing gasohol (with 10 percent ethanol), however, pays a 13-cent per gallon excise, or 5.4 cents per gallon less than those who purchase straight gasoline. A slightly higher excise is applied to gasohol sales with less ethanol. Of the 13 cents per gallon federal excise paid on a gallon of 10 percent gasohol, a user fee of 10.4 cents per gallon goes into the Highway Trust Fund—7.54 cents per gallon to the trust fund's Highway Account and 2.86 cents per gallon to the fund's Mass Transit Account. Two-and-a-half cents is deposited in the federal General Fund for deficit reduction purposes. (There is also a 0.1 cents per gallon contribution to the Leaking Underground Storage Tank Trust Fund.)

The combination of the 5.4 cent per gallon tax incentive for 10 percent gasohol and the 2.5 cent per gallon contribution to the general fund reduces deposits in the Highway Trust Fund Highway Account by 7.9 cents per gallon sold. (It is also worth pointing out that the Mass Transit Account of the Highway Trust Fund receives the same contribution from either the purchase of gasoline or gasohol. This means the cost of federal policies to promote the use of ethanol fuels comes exclusively at the expense of the Highway Account.)

As a result of TEA–21's provisions that directly link incoming Highway Account revenues to annual federal highway and bridge investment, the ethanol tax incentive has a direct consequence of making less revenue available for investment in needed highway and bridge improvements.

Impact of Alternative Fuel Incentives on Federal Highway Investment

The most current example of the impact of alternative fuel tax incentives on federal highway investment is the case of ethanol-based motor fuels. The computations in Table 1, based on 1999 ethanol use data reported in the Federal Highway Administration's "1999 Highway Statistics Report," show current federal tax policy on ethanol motor fuel sales results in approximately $1.1 billion per year of foregone Highway Trust Fund Highway Account revenues. Of the $1.1 billion, roughly $700 million per year is attributable to the 5.4 cents (10 percent ethanol) and 4.16 cents per gallon (less than 10 percent ethanol) tax incentive for gasohol and approximately $400 million is due to the 2.5 cents per gallon of the gasohol excise that is deposited in the federal general fund.

To put this number in perspective, it is roughly equivalent to total federal investment in Florida's state highway program in FY 2001 and four times the annual amount of federal highway formula funds received by the state of Montana.

Table 1

10 percent gasohol usage (gallons)	9,318,049,000
5.4 cents per gallon tax incentive	$503,174,646.00
2.5 cents per gallon to General Fund	$232,951,225.00
Lost Highway Account Revenues	$736,125,871.00
Less than 10 percent gasohol usage*	4,870,796,000
4.158 cents per gallon tax incentive	$202,527,697.70
2.5 cents per gallon to General Fund	$121,769,900.00
Lost Highway Account Revenues	$324,297,597.70
Total Lost Highway Account Revenues	$1,060,423,468.70

*According to the U.S. DOT, less than 10 percent gasohol is generally a 7.7 percent blend

Federal tax treatment of ethanol-based motor fuels impacts individual states differently. TEA–21's highway funding distribution formula requires the apportionment of Interstate Maintenance and Surface Transportation Program funds to be based, in large part, on a states contribution to the federal Highway Trust Fund's Highway Account. States that sell ethanol-based motor fuels are, therefore, at a relative disadvantage to states that don't. States that sell more ethanol than other states that also sell ethanol are also at a competitive disadvantage.

This problem was articulated at a June 14, 2000, Senate Clean Air, Wetlands, Private Property and Nuclear Safety Subcommittee hearing. Gordon Proctor, director of the Ohio Department of Transportation, testified on the impact ethanol's federal tax treatment has on his state's federal highway apportionments. Ohio motorists were the third largest purchasers of ethanol-based fuels in the nation in 1999, behind those in Illinois and Minnesota.

Mr. Proctor said, "[b]ecause ethanol-blended fuel is taxed differently from petroleum fuels, the increase in ethanol use has significantly decreased the amount of revenue credited to Ohio in the Highway Trust Fund." Ohio's federal formula funds are thus, he said, reduced by $185 million annually.

The Minimum Guarantee mechanism of TEA–21 helps mitigate this situation, but Ohio has not fully shared in the increased highway investments due to TEA–21's revenue aligned budget authority (RABA) provision that requires all user fee receipts above the level anticipated by TEA–21 to be invested in the federal highway program. The same situation is true in some other states.

Tables 2 and 3 (on pages 9 and 10, respectively) are from the Federal Highway Administration. They detail the current federal tax treatment of gasoline, diesel and alternative motor fuels, and the current use of ethanol-based motor fuels by the states.

Recent Developments

There are roughly 20 bills pending in Congress that would further promote the use of ethanol. Some of these measures would phase out or ban methyl tertiary butyl ether (MTBE) and functionally or statutorily require an increase in the use of ethanol. While I am not qualified to comment on the merits of MTBE or ethanol, I can assure you that requiring an increase in the use of gasohol would also increase the amount of lost revenues to the Highway Account and, therefore, further diminish the nation's ability to meet its highway infrastructure needs.

The developing situation in California could also further impact this dilemma. As a result of the state's decision to phase out MTBE and the Bush Administration's decision to not grant California a waiver of the federal oxygen content requirement for reformulated gasoline, some are projecting the state will increase its use of ethanol from 150 million gallons to 580 million gallons. If these projections are realized, the amount of lost Highway Account revenues due to the ethanol tax incentive will be increased.

Transportation leaders in a number of states have already indicated to us that when Congress takes up the reauthorization of TEA–21 changing the highway ap-

portionment formula to make up for lost revenues by large ethanol consuming states will be a top priority.

Recommendations

The nation is at a critical juncture.

It is clear America needs to reduce its dependence on foreign energy sources that power our U.S. transportation fleet.

It is clear that meeting federal air and water quality standards without compromising American mobility and the economy will require even cleaner transportation vehicles and motor fuels.

It is also clear that America has a growing transportation infrastructure capacity crisis—not just in the road network, but also in our airport, water port, rail and mass transit systems. If we do not meet our transportation network challenges, we will also compromise American mobility, air and water quality goals and the U.S. economy.

Mr. Chairman and members of the Committee, as you develop the tax portions of a new national energy policy . . . or environmental policy . . . we urge you to ensure that federal funding for much needed transportation improvements is not shortchanged in the pursuit of promoting use of alternative motor fuels.

And we will support you in any legislative effort that seeks to address the concern we have raised.

As a short-term measure, we respectfully suggest that since the federal deficit has been successfully addressed by the Congress there is no further need to impose a 2.5 cent per gallon tax on gasohol for the General Fund. We encourage you to redirect this revenue stream—which generates roughly $400 million per year—to the Highway Trust Fund's Highway Account as a highway user fee.

Finally, we urge that Congress initiate a comprehensive study that recommends financing mechanisms for federal highway and mass transit investment in the future, post-gasoline and diesel era. Perhaps Global Positions Technology should be used to charge user fees based on mileage driven or maybe autos and trucks should have a usage meter like we have for public utilities. There are many options that should be carefully explored. We need to prepare now for future transportation financing needs.

Mr. Chairman, that concludes my testimony. Again, thank you for the opportunity to present our views to the Senate Finance Committee. I will try to answer any questions you or other Committee members might have.

Table 2

FEDERAL HIGHWAY-USER FEES 1/

OCTOBER 2000 — TABLE FE-21E

USER FEE	TAX RATE	EFFECTIVE DATE	DISTRIBUTION OF TAX: HIGHWAY TRUST FUND: HIGHWAY ACCOUNT	HIGHWAY TRUST FUND: MASS TRANSIT ACCOUNT	LEAKING UNDER-GROUND STORAGE TANK TRUST FUND	GENERAL FUND
			Fuel Taxes (Cents per Gallon)			
Gasoline	18.3	01/01/96	12	2	-	4.3
	18.4	10/01/97	15.44	2.86	0.1	-
Diesel fuel	24.3	01/01/96	18	2	-	4.3
	24.4	10/01/97	21.44	2.86	0.1	-
Special fuels 2/ 3/	18.3	01/01/96	12	2	-	4.3
Liquefied Petroleum Gas	13.6	10/01/97	11.47	2.13	-	-
Liquefied Natural Gas	11.9	10/01/97	10.04	1.86	-	-
Other Special Fuels	18.4	10/01/97	15.44	2.86	0.1	-
Neat alcohol (85% alcohol) 3/ 4/	9.25	10/01/97	7.72	1.43	0.1	-
Compressed natural gas 5/	4.3	10/01/93	-	-	-	4.3
	4.3	10/01/97	3.44	0.86	-	-
Gasohol 6/						
10 percent gasohol made with Ethanol	12.9	01/01/96	3.4	2	-	7.5
	13	10/01/97	6.94	2.86	0.1	3.1
7.7 percent gasohol made with Ethanol	14.142	01/01/96	5.242	2	-	6.9
	14.242	10/01/97	8.782	2.86	0.1	2.5
5.7 percent gasohol made with Ethanol	15.222	01/01/96	6.322	2	-	6.9
	15.322	10/01/97	9.862	2.86	0.1	2.5
			Other Taxes - All Proceeds to Highway Account			
Tires	0-40 pounds, no tax Over 40-70 pounds, 15 cents per pound in excess of 40 Over 70-90 pounds, $4.50 plus 30 cents per pound in excess of 70 Over 90 pounds, $10.50 plus 50 cents per pound in excess of 90					
Truck and trailer sales 7/	12 percent of retailer's sales price for tractors and trucks over 33,000 pounds gross vehicle weight (GVW) and trailers over 26,000 pounds GVW					
Heavy vehicle use	Annual tax: Trucks 55,000-75,000 pounds GVW, $100 plus $22 for each 1,000 pounds (or fraction thereof) in excess of 55,000 pounds Trucks over 75,000 pounds GVW, $550					

1/ Source: Office of Highway Policy Information, Federal Highway Administration.

2/ Special fuels include benzol, benzene, naphtha, liquefied petroleum gas, casing head and natural gasoline, or other liquid used fuel in a motor vehicle except diesel, kerosene, gas oil, fuel oil, or a product taxable under the gasoline tax provisions. Prior to October 1, 1997, most special fuels were taxed at a single rate. Exceptions were LPG, which was not subject to the LUST tax, and neat alcohols, which are taxed at various rates depending on type and source of alcohol. Beginning October 1, 1997, LPG and LNG are taxed based on their energy content relative to gasoline. Other special fuels, with the exception of neat alcohols, are taxed at the basic special fuels rate.

3/ Neat alcohol made with alcohol derived from petroleum products (M85) is taxed as a special fuel.

4/ In 1998, only $329,000 was collected by Internal Revenue Service for taxes on neat alcohol and some other miscellaneous sources. There is no accurate way to distribute miscellaneous taxes to specific funds or accounts.

5/ Compressed natural gas is taxed 48.54 cents per thousand cubic feet (MCF), with the Mass Transit Account receiving 9.7 cents per MCF and the Highway Account receiving 38.83 cents per MCF. Roughly converting these amounts to cents per gallon results in the entries in the table above.

6/ Section 1920 of the Energy Policy Act of 1992 expanded the definition of gasohol effective January 1, 1993. Prior to the Act, gasohol was defined as a blend of gasoline and at least 10 percent fuel alcohol (by volume), and blends containing less than 10 percent alcohol were taxed as gasoline. Under the Act, the product now called 10 percent gasohol corresponds to the old definition. Two additional types of gasohol are also defined. The term 7.7 percent gasohol includes gasoline-alcohol blends where the alcohol content is at least 7.7 percent but less than 10 percent. The term 5.7 percent gasohol includes gasoline-alcohol blends where the alcohol content is at least 5.7 percent but less than 7.7 percent.

7/ Section 1401 of the Taxpayer Relief Act of 1997 replaced a mechanism by which the fair market value of tires exceeding 40 pounds was deducted from the fair market value of a truck and replaced it with a credit for the excise tax paid. This provision was effective January 1, 1998.

Table 3

ESTIMATED USE OF GASOHOL - 1999 1/

OCTOBER 2000 (THOUSANDS OF GALLONS) TABLE MF-33E

STATE	TOTAL ETHANOL USED IN GASOHOL 2/	GASOHOL 10-PERCENT GASOHOL 3/	GASOHOL LESS THAN 10-PERCENT GASOHOL 4/	TOTAL
Alabama	406	4,061	-	4,061
Alaska	4,249	27,239	2	27,241
Arizona	13,737	-	178,404	178,404
Arkansas	-	-	-	-
California	52,384	-	919,024	919,024
Colorado	47,925	228,936	325,080	554,016
Connecticut	3,280	24,776	10,421	35,197
Delaware	-	-	-	-
Dist. of Col.	-	-	-	-
Florida	897	8,973	-	8,973
Georgia	-	-	-	-
Hawaii	-	-	-	-
Idaho	-	-	-	-
Illinois	215,565	1,009,965	1,487,905	2,497,870
Indiana	95,281	883,229	90,369	973,598
Iowa	70,900	708,995	-	708,995
Kansas	5,252	52,523	-	52,523
Kentucky	3,298	32,980	-	32,980
Louisiana	1,476	14,756	-	14,756
Maine	-	-	-	-
Maryland	2,312	23,125	-	23,125
Massachusetts	-	-	-	-
Michigan	35,898	358,979	-	358,979
Minnesota	206,542	1,032,708	1,341,179	2,373,887
Mississippi	-	-	-	-
Missouri	15,257	114,246	49,771	164,017
Montana	411	3,984	167	4,150
Nebraska	22,127	221,268	-	221,268
Nevada	23,883	95,470	186,176	281,646
New Hampshire	-	-	-	-
New Jersey	7,032	29,427	53,113	82,539
New Mexico	21,030	210,298	-	210,298
New York	12,795	79,131	63,407	142,538
North Carolina	31,413	314,130	-	314,130
North Dakota	4,630	46,304	-	46,304
Ohio	207,956	2,079,559	-	2,079,559
Oklahoma	-	-	-	-
Oregon	11,238	106,411	7,751	114,161
Pennsylvania	10,623	106,229	-	106,229
Rhode Island	-	-	-	-
South Carolina	-	-	-	-
South Dakota	19,124	191,242	-	191,242
Tennessee	-	-	-	-
Texas	51,218	502,169	13,004	515,173
Utah	9,485	54,791	52,021	106,811
Vermont	-	-	-	-
Virginia	29,560	295,605	-	295,605
Washington	26,651	255,611	14,157	269,768
West Virginia	4	42	-	42
Wisconsin	26,160	200,890	78,844	279,734
Wyoming	-	-	-	-
Total	1,290,001	9,318,049	4,870,796	14,188,845

1/ This table shows Federal Highway Administration estimates of gasohol use. The gasohol volumes shown include both the ethanol and the gasoline components. The Energy Policy Act of 1992 expanded the definition of gasohol effective January 1, 1993. Prior to the Act, gasohol was defined as a blend of gasoline and at least 10 percent, by volume, fuel alcohol. Under the Act, three types of gasohol were defined: (1) 10-percent gasohol, which corresponds to the definition before the Act; (2) 7.7-percent gasohol, which contains at least 7.7 percent alcohol but less than 10 percent; and (3) 5.7-percent gasohol which contains at least 5.7 percent alcohol but less than 7.7 percent.

2/ The amount of ethanol used in gasohol is estimated from gasohol tax collections, refunds, and credits reported by the Internal Revenue Service, U.S. Department of the Treasury.

3/ For most States, the figures shown for 10-percent blends are State data.

4/ 7.7-percent gasohol is generally used to meet the requirements for oxygenated fuel to reduce winter carbon monoxide emissions.

PREPARED STATEMENT OF VIRINDER SINGH

Chairman Baucus, members of the Committee, thank you for inviting me to today's hearing.

The Renewable Energy Policy Project is a non-profit devoted to educating both the public and key decisionmakers about renewable energy policies, market trends, and technologies. We have produced over 30 reports that discuss the many intersections between renewable energy, changing electricity markets, and environmental quality. Our reports are peer-reviewed, and are the result of our extensive interactions with

renewable energy firms, utilities, state and federal government officials, and environmentalists.

Today, I will discuss the implications of renewable energy technologies and markets on the production tax credit. Please note that I am not a tax specialist, so the intricate details of tax policy are not the focus of my testimony. Instead, REPP works on technologies and markets, which are important when thinking about the PTC.

Based on our observations of the energy sector, and on our extensive discussions with utilities and renewable energy firms, I offer seven key observations:

- First, renewable energy is important to the United States
- Second, the PTC has played a pivotal role for renewable energy
- Third, the PTC should be extended
- Fourth, the PTC should be made permanent
- Fifth, the PTC should be expanded to include geothermal and open-loop biomass technologies
- Sixth, support for renewables in the public power sector is also important
- And seventh, other policies beyond the production tax credit are essential to advance renewables.

I will now discuss each of these points in greater detail.

1. Renewable Energy Is Important to the United States

Renewable energy offers many values to Americans, though I will not spend too much time outlining all of these values.

Given the current volatility in the electricity market, it is important to emphasize that fuel-free sources such as wind, solar and geothermal typically have predictable price patterns. This insulates American households from high natural gas prices, much as T-bills can shield investors from wild .com stocks.

Further, renewables offer substantial economic development benefits. Benefits include revenues for rural communities and landowners, as well as new jobs in manufacturing, construction, and installation. One REPP study found that adding 10,000 MW of wind power to the U.S. over 10 years would generate nearly $8 billion in revenues.

And finally, renewables have little to no emissions compared with coal power and even natural gas. From a price stability perspective, this means renewables have low regulatory risk. There is little to no need for pollution control retrofits or other approaches, thereby reducing energy suppliers' worry that environmental policy will shrink their bottom line. Thus, American consumers do not have to worry about passed-on cost increases.

2. The Production Tax Credit Is Important for Renewable Energy

The production tax credit, which currently offers 1.5 cents per kWh (1.7 cents per kWh when adjusted to inflation) to wind, closed-loop biomass facilities and power plants fed by poultry litter, has played an important role in renewable energy development, by supporting the development of wind power.

Texas provides a good example. The state passed a "renewable portfolio standard" requiring 2,000 MW of new renewable energy facilities by 2009. In response, over half of the 2,000-MW mandate will be fulfilled by the end of 2001, 8 years before the deadline for compliance. The renewable portfolio standard is the main reason wind is now prevalent in Texas. But the production tax credit is a primary reason for the rush of wind installations before the end of 2001, which is when the production tax credit ends.

Thus the production tax credit played an important role in the *timing* of $1 billion of investment in wind power in Texas over a 2.5-year period, from mid 1999 to the end of 2001, though it was the renewable portfolio standard that encouraged wind development in Texas in the first place.

I believe this a crucial story. Texas housed virtually no wind power capacity before the renewable portfolio standard was passed. However, the renewable portfolio standard catalyzed a surge of projects and investments, particularly into west Texas. But wind companies found the production tax credit of such value they sped up their activities beyond most observers' wildest expectations. The renewable portfolio standard and the production tax credit go hand-in-hand.

One key lesson from Texas: The production tax credit is very important to the world of private capital, which is essential for continued renewable energy development. But as my next recommendation states, the potentially short-lived wind "boom" in Texas is not necessarily the best path to the orderly development of the renewable energy industry.

3. The Production Tax Credit Should Be Extended

One significant lesson from the history of renewable energy development is that sharp, policydriven spikes in investment and business activity are not good for the industry. The most well known example is the case of tax credit for solar water heaters in the 1980s. In this case, a heavy dose of public incentives over a short period of time encouraged rapid, even hasty business development. Ephemeral tax credits did not lead to the earnest expansion of capital and overall industry capability. Instead, when the tax credits ended, so did most of the domestic industry. Policies that encourage only short spurts in sales are not nearly as useful as policies that provide a more predictable investment environment that is not buffeted by volatility.

In a current example, in the U.S. approximately 2,000 MW of wind power is coming on-line nationwide. That means about $2 billion of investments in wind power. As in Texas, the timing of the PTC is the prime reason for the timing of this investment, though not necessarily the top driver for the investment itself.

Based on our discussions with the wind industry and utilities, the surge is so great that wind developers are stretched to their limit. They cannot take on much more business this year, even though opportunities continue to present themselves. In an ideal scenario, the PTC would last past 2001, stimulating an orderly increase of projects that is in accordance with the size of the wind industry today. The problem with short eligibility periods is that, without longevity, it does not encourage the kinds of capital investment in wind-related businesses that are essential for long-term progress. Instead, short-term measures force the existing resources of the wind industry to do a lot in one year, with the possibility of a sharp contraction from which it must recover in the future.

It appears that if the PTC is to contribute to the steady growth on the U.S. renewable energy industry, it must avoid cycles of boom and bust, or at least contribute to smoother cycles so that the nation does not squander the market and technical advances it has pursued for decades, the fruits of which are just now starting to be realized.

4. The Production Tax Credit Should Be Made Permanent

The timing of the production tax credit is crucial to its success, however the Committee chooses to define the goal of the production tax credit.

Based on REPP's interactions with the utility industry, and given the volatility in the U.S. electricity market today, particularly in the West, I expect that many renewable energy projects will progress very slowly for two reasons. First, investors are awaiting the results of overlapping energy policy deliberations. Second, project developers must seek siting permission and access to scarce transmission lines.

This means that a tax credit policy that only applies to projects coming on line within a couple of years will not on its own support as many profitable projects as possible. Instead, extending the PTC beyond at least five years will be essential if it is to be effective, particularly in the West.

Overall, ideally the most stable, predictable PTC is a permanent one, which does not induce market booms and busts but facilitates steady market development.

5. The Production Tax Credit Should Be Expanded to Other Renewables

I believe the PTC can be expanded and meet a number of possible national energy goals. First, I would like to provide a little background on this.

What we are seeing right now is a surge of wind development. As I've already mentioned, this growth is partly due to the federal production tax credit passed in 1992. The cost of wind power is cheaper per kWh than other renewables, assuming good to excellent wind sites. But wind power trends should not eclipse the potential of other technologies.

According to a report published by REPP, price reductions in geothermal, wind, solar and biomass have exceeded most published price expectations over the last 25 years. Steady yet hard-won improvements in the efficiency of these technologies are a big factor for the cost declines.

And according to the Clean Energy Futures study completed by 5 federal labs, under an aggressive policy scenario, wind would grow over 45 times current capacity by 2010. At the same time, geothermal triples and biomass grows by over five times.

There is significant potential for all of these technologies—thus there is little reason that the design of the production tax credit should favor one technology over another at the outset.

Just as important as national potential is regional potential. Different states have different renewable energy endowments. Based upon preliminary studies by REPP, biomass resources dominate the South's renewable resource endowment. Geo-

thermal energy potential is concentrated in the West, which is desperately searching for new supply. And wind power is at its best in the middle of the United States.

Making all of these technologies eligible for the production tax credit means that states throughout the United States can benefit.

A special note is worth mentioning for biomass. The general order of biomass feedstocks, from cheapest to most expensive, is landfill gas, urban wood waste, agricultural processing residues (such as nut hulls), forest clearing residues, agricultural field leftovers, and energy crops. Energy crops are considered "closed loop" and currently qualify for the production tax credit under current law. All other sources are considered "open-loop biomass" and do not qualify for the production tax credit. In order to unleash the use of these resources, then expanding biomass eligibility under the PTC to include "open-loop" biomass is essential.

Among the different biomass technologies, there is growing expectation that cofiring will play a prominent role in future biomass development. Co-firing involves substituting between 5% to 10% of a coal plant's heat input with biomass. While coal plant owners have been slow to adopt co-firing, numerous demonstration projects, such as TVA's Kingston plant in Tennessee and IES Utilities' Chariton Valley project in Iowa, will help make other utilities more comfortable in developing cofiring. Many renewable energy advocates see co-firing as a way to stimulate a biomass feedstock supply network that will feed other biomass energy technologies. A production tax credit can play an important role in making this relatively cheap opportunity more prominent nationwide.

6. Support for Public Power Is Vital

It is important for the federal government to support the efforts of public power entities, such as rural electric cooperatives, tribal utilities and municipal utilities. Co-ops such as the Kotzebue Electric Association in Alaska, municipal utilities such as those in Sacramento and Los Angeles, and tribes such as the Rosebud Sioux are all developing renewable energy.

Yet based on our discussions with public power officials, the Renewable Energy Production Incentive (KEPI), which is based on annual appropriations, has too much uncertainty to nurture sustained investment in renewables. One concept to help public power, advanced by the American Public Power Association, is tradable tax credits, which are credits allocated to public power entities who can then sell them to investorowned entities, or even transfer them to their customers who choose to buy renewable energy from the public power entity.

Overall, based on the level of interest in renewable energy REPP has observed from public power agencies, there is little reason from a renewable energy development perspective to restrict tax credit benefits to taxpaying entities. Opening opportunities to public power can increase the ability of U.S. tax policy to encourage renewable energy development in the rural United States.

7. Other Policies Are Essential to Advance Renewables

Finally, it is of the essence to remember that the production tax credit by itself will not directly lead to a sudden expansion of renewable energy markets. Instead, a number of other factors have to come into play if renewables are to flourish. These factors include:

- Favorable technology developments through continued research and development, which lower cost and meet customer needs,
- Renewable portfolio standards at the federal and/or state level, whereby energy suppliers are required to draw upon renewables for a portion of their supply,
- System benefits funds, which entail a small surcharge on consumers' monthly bills to support renewables, as well as energy efficiency and low-income energy supply,
- Transmission policies that open access to existing and new transmission lines to renewable energy facilities, and
- Distribution grid policies, at both the federal and state level, which encourage small-scale power technologies that improve service and reduce the need for expensive transmission.

Thank you for the opportunity to speak on these timely issues that affect our nation's future.

PREPARED STATEMENT OF JIM WELLS

Mr. Chairman and Members of the Committee:

We are pleased to be here to discuss alternative motor fuels and vehicles and related tax incentives. As you know, the transportation sector accounts for the bulk

of the petroleum consumption in our nation, currently representing about two thirds of total petroleum use and roughly a quarter of our total energy consumption. Each day, vehicles in the United States consume about 10 million barrels of petroleum fuels, primarily gasoline and diesel. According to projections made by the Energy Information Administration (EIA), this figure will rise to about 15 million barrels per day by 2010, much of which will be met by importing oil. This trend has long been a source of national concern.

Partly to address this concern, a number of measures have been taken over the past 25 years either to reduce petroleum consumption or to increase fuel diversity in the transportation sector, including tax incentives, mandates for alternative fuel vehicles, and laws to promote automobile fuel efficiency.[1] In 1992, Congress passed the Energy Policy Act (EPACT) which, among other things, sought to replace at least 10 percent of the projected petroleum fuels consumed by Light Duty Vehicles in 2000 and 30 percent in 2010 with alternative fuels—such as ethanol, methanol, liquefied petroleum gas, compressed natural gas, liquefied natural gas, and electricity. To achieve these goals, Congress has established federal tax deductions and credits aimed at encouraging the purchase of alternative fuel vehicles and use of alternative fuels. Federal agencies, state governments, and private consumers have purchased an increasing number of alternative fuel vehicles. Despite these efforts, alternative fuel use in the transportation sector remains very small.

Recently, GAO has issued several reports examining, among other things, federal programs to promote alternative fuel vehicles and alternative fuel use in the transportation sector.[2] My testimony today, which is based on these reports, specifically discusses the extent of alternative fuel vehicle acquisition and fuel use, some of the barriers inhibiting greater use of alternative fuels and vehicles, and the federal tax incentives used to promote the use of alternative motor fuels and vehicles.

PURCHASES OF ALTERNATIVE FUEL VEHICLES AND THE USE OF ALTERNATIVE MOTOR FUELS REMAIN LIMITED

Limited progress has been made in increasing the numbers of alternative fuel vehicles in the national vehicle fleet and the use of alternative fuels, relative to conventional fuel vehicles and gasoline and diesel. For example, according to EIA's estimates, alternative fuel vehicles accounted for about 1 million or 0.4 percent of all vehicles in the United States in 1999. EIA also estimates that alternative fuels accounted for the equivalent of about 354 million gallons of gasoline or about 0.2 percent of total vehicle fuels consumption in 2000. When alternative fuels that are used as oxygenates in gasoline, such as ethanol and MTBE are added, the total increases to about 4.5 billion gallons or less than 3 percent of the total motor fuels consumption—about 162 billion gasoline-equivalent gallons—in 2000. As shown in figure 1 below, the consumption of alternative fuels has increased in absolute magnitude since the early 1990s, but its relative share in total motor fuel consumption has remained very small.

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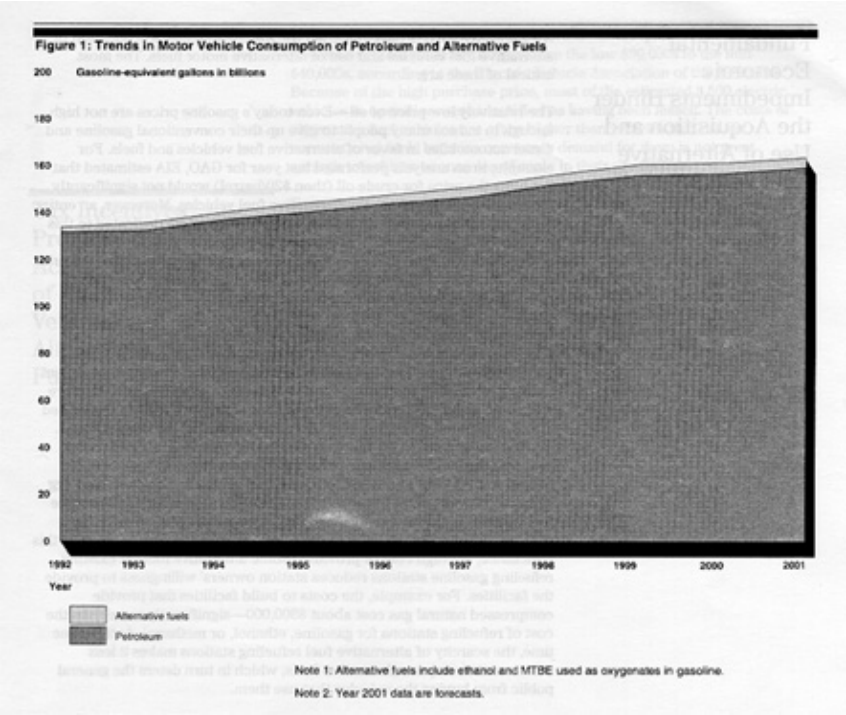
[1] Some of the other steps that have been taken to reduce petroleum consumption in the transportation sector include encouraging the use of mass transit and high-occupancy vehicles (e.g., carpooling).

[2] *Tax Incentives for Petroleum and Ethanol Fuels* (GAO/RCED–00–301R, Sept. 25, 2000), *Energy Policy Act of 1992: Limited Progress in Acquiring Alternative Vehicles and Reaching Fuel Goals* (GAO/RCED–00–59, Feb. 11, 2000), *Energy Policy Act: Including Propane as an Alternative Motor Fuel Will Have Little Impact on Propane Market* (GAO/RCED–98–260, Sept. 24, 1998), *Tax Policy: Effects of the Alcohol Tax Incentives* (GAO/GGD–97–41, Mar. 6, 1997).



FUNDAMENTAL ECONOMIC IMPEDIMENTS HINDER THE ACQUISITION AND USE OF ALTERNATIVE FUEL VEHICLES AND ALTERNATIVE MOTOR FUELS

A number of barriers have impeded the American public's acquisition of alternative fuel vehicles and use of alternative motor fuels. The most critical of these are:

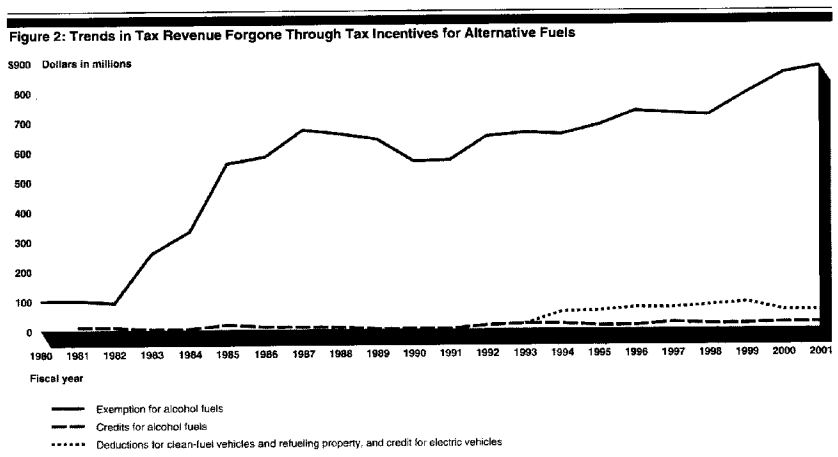
- The relatively low price of oil—Even today's gasoline prices are not high enough to induce many people to give up their conventional gasoline and diesel automobiles in favor of alternative fuel vehicles and fuels. For example, in an analysis performed last year for GAO, EIA estimated that doubling the price for crude oil (then $20/barrel) would not significantly increase the market share for alternative fuel vehicles. Moreover, an entire refueling infrastructure and automanufacturing system dedicated to this fuel has been established. This system has become so developed and entrenched over time that even if the price of gasoline rose above the price of an alternative fuel, many consumers would be reluctant to switch to alternative fuel vehicles and alternative fuels.
- Insufficient availability of alternative fuel refueling infrastructure—Likewise, the limited number of refueling stations for alternative fuels, compared with gasoline and diesel stations, has been a major impediment to using alternative motor fuels and vehicles. For example, in 1999, there were only about 6,000 refueling stations for alternative fuels in the United States, compared with over 180,000 conventional fuel refueling stations. The federal and state officials that administer vehicle fleets told us last year that the lack of adequate refueling infrastructure represents the biggest impediment to using alternative fuel vehicles. A chicken- and-egg situation prevails here. Because of the insufficient number of alternative fuel vehicles in the nation's vehicle fleet, owners of gasoline refueling stations are reluctant to provide refueling facilities for them. Adding to this reluctance, the high cost of providing some alternative fuels at existing refueling gasoline stations reduces station owners' willingness to provide the facilities. For example, the costs to build facilities that provide compressed natural gas cost about $300,000—significantly more than the cost of refueling stations for gasoline, ethanol, or methanol. At the same time, the scarcity of alternative fuel refueling stations makes it less convenient to acquire alternative

fuels, which in turn deters the general public from buying the vehicles that use them.

- The relatively higher cost of certain alternative fuel vehicles—According to most stakeholders we contacted last year, on average, alternative fuel vehicles cost more than conventional vehicles which reduces the incentive for their purchase, although these costs vary by type of vehicle. For example, a vehicle that runs on compressed natural gas generally costs from $3,000 to $5,000 more than the conventional version of the same vehicle. In addition, last year, we reported that the price of an electric-powered vehicle generally ranges from the low $30,000s to the mid-$40,000s, according to the Electric Vehicle Association of the Americas. Because of the high purchase price, most of the estimated 3,500 electric vehicles in operation were identified as having been leased. The costs of alternative fuel vehicles are often higher than vehicles that run on conventional fuels because consumer demand for them is not great enough to achieve economies of scale in their production.

TAX INCENTIVES PROMOTE THE ACQUISITION AND USE OF ALTERNATIVE FUEL VEHICLES AND ALTERNATIVE MOTOR FUELS

To promote increased use of alternative fuels and vehicles in the transportation sector, Congress has supported and enacted certain tax incentives, including federal tax exemptions, credits and deductions. Based on U.S. Treasury Department's estimates, since the late 1970s, these tax incentives have resulted in forgone tax revenues of about $13 billion for alcohol fuels and about $600 million for clean-burning fuels and electric vehicles, in year-2001 dollars.[3] These amounts comprise only a small share of the total transportation tax incentives over the years (much of which has been devoted to conventional fuels) but, as figure 2 shows, they have risen fairly steadily over time.



In conclusion, so far, based on our studies and EIA's statistics, alternative fuels and vehicles have not made much of a dent in the conventional fuel and vehicle dominance of the U.S. vehicle fleet, primarily because of the fundamental economic obstacles just discussed. As we reported in our February 2000 report, any significant increase in the use of alternative motor fuels and vehicles by the general public will depend on two main factors: (1) a dramatic and sustained increase in the price of gasoline and (2) very large incentives, far above the current levels, to reduce the cost of using alternative fuels and vehicles. Depending on what happens to conventional fuel prices, these incentives would likely need to be maintained for sometime—at least until the number of vehicles reaches the level necessary to support an economically sustainable infrastructure.

[3] Qualifying clean burning fuels include natural gas, liquefied natural gas, liquefied petroleum gas, hydrogen, or other fuels composed 85 percent of methanol, ethanol, any other alcohol, ether, or any combination of these.

Mr. Chairman, this concludes my prepared remarks. We would be pleased to answer any questions you or any other member of the Committee may have.

PREPARED STATEMENT OF RONALD W. WILLIAMS

Introduction

Good morning, Mr. Chairman and Members of the Committee.

My name is Ron Williams. I am president, Chief Executive Officer and an owner of Gary-Williams Energy Corporation, a Denver-based oil refining and wholesale marketing company. Our primary asset is a 50,000 BPD crude oil refinery in Wynnewood, Oklahoma. Company-wide, we have about 275 employees and fall within the small business refiner definition used for the EPA's rulemaking on highway diesel fuel which was published on January 18, 2001. (Heavy Duty Engine and Vehicle Standards and Highway Diesel Fuel Sulfur Control Requirements.) These regulations create a stringent new diesel sulfur standard of 15 parts per million for most on-road diesel volume beginning in June 2006—a 97% reduction from the current 500 ppm standard.

Small Refiner Coalition

I speak today on behalf of an Ad Hoc Coalition of Small Refiners who—over the last several years—have worked together on the SBREFA (Small Business Regulatory Enforcement Fairness Act) panel investigation into the proposed EPA rule—and thereafter on tax issues. Under the EPA definition, a small business refiner must have fewer than 1500 employees and less than 155,000 BPD total capacity. Our group includes the 18 small business refiners which still operate diesel producing facilities in this country. Their names and locations are attached to the statement distributed to you. Together we produce about four percent of the nation's diesel fuel. In some regions, we supply over half of the diesel fuel needed. Our small business refineries are U.S. companies run by U.S. citizens and include one farmer cooperative.

Fuel Supply will be Restricted without Help to Small Refiners

Let me state clearly that we do not quarrel with EPA's clean air objectives. We worked closely with the agency as the rule was being developed and want to comply completely in the specified time frame. Indeed, EPA wanted but was unable to find ways to reduce the disproportionate economic burdens on small refiners and encouraged us to address the issue with our Congressional delegations.

It is very difficult for us to comply with these federal mandates without federal assistance, most specifically tax incentives initiated by this Committee and the House Ways and Means Committee. In the absence of this assistance, our alternatives will be either to dramatically cut back or cease production of on-road diesel fuel or to go out of business all together. When EPA further regulates off-road fuel, as is expected soon, the off-road market will no longer be a viable alternative.

As you explore the role of federal assistance in the development of national energy policy and specifically the use of tax incentives in fuel supply, we urge you to consider carefully the immediate impact on the transportation of U.S. goods, on agriculture, on small fuel retailers, and on the U.S. consumer, if up to 4 percent of on-road diesel fuel were no longer available.

Our industry encourages the development of alternative energy sources, more efficient vehicles and machinery and more extensive conservation of our limited resources. We believe, however, all that will not be enough to avert a supply shortage in the short term.

Existing U.S. refineries are operating at full sustainable capacity. Fifty-one refineries with a total crude capacity of about 1.3 million BPD have shut down since 1992; some 33 of those were small refiners (Turner Mason). With the exception of one small topping facility in Alaska, no new refinery has been built in the United States for almost 25 years. Historic profit levels, new environmental regulations and permitting requirements do not support the enormous costs of siting and building new facilities. In our case, for example, we estimate that the replacement cost of our small plant would be more than 20 times what we paid for it only 6 years ago.

The new regulations will result in a reduction of on-road diesel production. A recent Charles River Associates study projects a nationwide average shortfall of more than 12%, with particularly acute supply shortages of up to 37% in some regions. At the same time, U.S. consumer demand for diesel fuel, as forecast by the Energy Information Administration, is expected to grow by 6.5 percent between now and 2007. If small business refiners are eliminated from diesel production, supply shortages will become even more likely.

Small Business Refiners are a Critical Part of the U.S. Economy

There will be other impacts if small business refiners disappear. We have long served an essential function of maintaining competition. Cumulatively, our impact is substantial and decidedly procompetitive. The Society of Independent Petroleum Marketers (SIGMA) agrees. SIGMA's more than 300 member companies believe that small refiners give them an important pricing and alternative supply source advantage in their dealings with the majors selling branded products. SIGMA, whose members supply 28,000 retail outlets and employ 270,000 people, has asked to be part of our small refiner efforts to obtain federal help to stay in the diesel business. Often the small independent provides the lowest wholesale price in the market for gasoline and diesel. If small refiners are forced out of business, the rapid and pervasive trend toward megamergers in the industry will continue unchecked. And historically, small refiners have been the lifeblood of the small, often rural and remote communities in which we operate.

Small business refiners also fill a critical national security function. We have supplied almost 20 percent of the jet fuel used by U.S. military bases. In the event we cease operations because we cannot make the new ultralow sulfur fuel, this resource would not be available to the US. military.

Small Business Refiners Severely Disadvantaged by New Rule

The impact of these new diesel regulations on small business refiners will be substantial and disproportionate, as EPA acknowledged in the final rule. Given the limits of its authority and the intolerance of new diesel engine technology, however, EPA was not able to offer small refiners any assistance in diesel standard compliance. A phasing in of the new standards, for example, is not a viable accommodation, even though the fleet turnover to new engines may take several years. The distribution system will not accommodate three grades of fuel. More importantly, small refiners must make the required capital investment up front. It is more cost efficient to engineer and construct equipment of this nature at one time, rather than in phases.

The disproportionate costs of compliance include both up-front capital expenditures and increased on-going operating costs. Understandably, these costs vary from facility to facility because of different refinery configurations and crude oil feedstocks.

EPA estimates average capital costs of $14 million per small refiner facility. For some, the cost will be substantially more. EPA's numbers indicate that on a cost per barrel basis, small refiners must invest almost 20% more than large refiners. Small business refiners believe the differential will be substantially higher.

In our case for example, we expect the capital cost to reach 15 ppm diesel sulfur will total in excess of $45 million, about twice what we paid for the refinery. In addition our annual operating and maintenance costs will increase $6 to $7 million. To comply also with the Tier 2 gasoline desulfurization regs and new air toxics rules we think our capital costs could total almost $80 million in the five year period between 2003 and 2007. We now fear that EPA may retroactively reinterpret the Clean Air Act New Source Review regulations (via Section 114 requests) and will impose major additional compliance costs on our facility.

Proposal Includes Expensing and Production Credit

Given the magnitude of the mandated expenditures and the short time frame under which they must be expended, our small business refiner coalition proposes an approach which combines a provision to allow expensing 75% of "qualified capital costs" paid or incurred and an environmental tax credit (ETC) which is a production credit equal to 5 cents for each gallon of ultra low sulfur diesel produced. This earned credit would be capped at 25% of qualified capital costs. Since many small business refiners are just beginning to pay under the regular income tax regime (due to loss carryforwards and application of the corporate alternative minimum tax), the tax incentives should not be subject to the AMT.

Certification of qualified capital costs would include EPA verification that the equipment to be constructed and installed is necessary to allow the facility to comply with the applicable regulations. In our case, for example, a new diesel hydrotreater, sulfur plant and amine unit would have to be in place and producing 15 ppm diesel before we would qualify. A brief description of this proposal is attached to my testimony.

It is important to note that small refiners do not have many of the benefits enjoyed by major diversified, integrated oil and gas companies which can raise necessary investment capital in the open market. These large companies have

- easy access to both debt and equity capital,
- lower cost of capital,

- significant overhead savings and buying power with multiple refineries,
- the ability of one business segment to 'carry' another segment, and
- enormous staying power.

We believe this "75/25" approach would net a small business refiner approximately 25% of actual expenditures. (Net present value of the ETC and expensing compared with current law10 year double declining depreciation yields approximately 25%.) We believe that the total cost of the proposal to the federal government would be $80 to $90 million over ten years.

Bankers are reluctant to finance investments of this magnitude when they can foresee no return on investment. We believe the "75/25" provision would give our bankers the confidence they need to help us finance these extraordinary costs.

Credits are a Stay in Business Requirement

We are aware that some members of this committee are hesitant to endorse tax credit as a matter of principle. We understand and appreciate that position. All we can say to you now is that—after extensive exploration of alternatives—we have not found any other approach that would level the playing field so that we can comply with these diesel sulfur regulations.

It is the federal government that has told us we must spend at least $300 million to stay in business. We seek this tax incentive to meet the government mandate and to preserve small but essential players in a critical segment of the economy. Let me emphasize that the ETC is an earned credit. Small business refiners will realize no benefit from it unless we produce compliant fuel.

On behalf of small business refiners, I thank you for the opportunity to speak today and for your consideration of these issues. I will be happy to answer any questions.

Small Business Refiners Producing Diesel

Age Refining Company	San Antonio, TX
American Refining Company	Bradford, PA
Calcasieu Refining Company	Lake Charles, LA
Countrymark Cooperative, Inc.	Mt. Vernon, IN
Frontier Oil Corporation	Cheyenne, WY; El Dorado, KS
Gary-Williams Energy Corporation	Denver, CO (Wynnewood,OK)
Golden Bear Oil Specialties	Bakersfield, CA
Silver Eagle Refining-Woods Cross, Inc.	Woods Cross, UT
Kern Oil & Refining Company	Bakersfield, CA
Montana Refining Company	Great Falls, MT
Navajo Refining Company	Artesia, NM
Paramount Petroleum Corporation	Paramount, CA
Petro Star, Inc.	North Pole and Valdez, AK
Placid Refining Company	Port Allen, LA
San Joaquin Refining Company	Bakersfield, CA
Somerset Refining Company	Somerset, KY
U.S. Oil & Refining Company	Tacoma, WA
Wyoming Refining Company	Newcastle, WY

SMALL BUSINESS REFINER TAX RELIEF TO MEET EPA ENVIRONMENTAL STANDARDS

A two component proposal to provide investment expensing and an environmental tax credit for refinery upgrades necessary to meet EPA sulfur regulations.

General Description of the Facility Expensing Proposal.

Small Business Refiners would be allowed to expense 75% of capital costs paid or incurred in order to comply with the applicable EPA regulations. The expensing of these expenditures would not be subject to the corporate alternative minimum tax. Relevant definitions are detailed below in the description of the Environmental Tax Credit.

General Description of the Environmental Tax Credit.

Small Business Refiners would be allowed an environmental tax credit (ETC) equal to 5 cents for every gallon of 15 parts per million diesel produced during the applicable period. The total amount of the credit would be capped at 25 percent of the qualified capital costs incurred in order to comply with the applicable EPA regulations.

Definition of Small Business Refiner. A taxpayer who qualifies for the tax credits is defined as a "small business refiner" under the EPA definition, *i.e.* refiners with fewer than 1500 employees and less than 155,000 bpd total capacity.

Applicable EPA Regulations. The "applicable EPA regulations" are the "Highway Diesel Fuel Sulfur Control Requirements."

Qualified Capital Costs. Qualified capital costs are those capital costs incurred during the applicable period in order to comply with the applicable EPA regulations, and shall include but are not limited to new process operating unit construction and/or dismantling and reconstruction of existing process units to be used in the production of the 15 PPM or lower sulfur diesel fuel. This will also include all associated adjacent or offsite equipment such as, but not limited to tankage, catalyst, power supply, engineering, construction period interest and sitework expenditures related to the project to allow the production of the 15 PPM sulfur diesel fuel.

Application of the Alternative Minimum Tax. The ETC is not subject to the AMT.

Applicable Period. Qualified capital costs must be incurred after date of enactment, and until one year after the date the taxpayer must meet the EPA regulations. The ETC attributable to qualified capital costs may be recovered (through application of the 5 cents per gallon credit) over any period necessary to meet the 25 percent cap. The ETC could be carried back 1 year and/or carried forward over 20 years.

Certification Process. The EPA must certify that the equipment to be constructed and installed is necessary to allow the facility to comply with the applicable EPA regulations. The taxpayer is required to submit an application describing the equipment to be installed to comply with the applicable EPA regulations. Such description should include relevant information regarding unit capacities and operating characteristics sufficient for EPA to determine that such equipment is necessary for compliance with the applicable regulations. All documented applications will be reviewed and certified within 60 days of receipt. Certification is not necessary at the time the credit is taken. However, the certification must ultimately be obtained by the taxpayer within 30 months of filing the tax return on which the ETC is claimed.

Basis Reduction. The basis of qualified capital costs would be reduced by the amount of ETC claimed for the purpose of computing depreciation.

Credit Recapture on Disposition. Only the first taxpayer to place the qualified capital costs in service is entitled to take the credit. In the event, the taxpayer disposes of the capital within 5 years of the placed in service date, then a 5-year recapture rule applies. The recapture period is 5 full years from the original date as "placed in service," and is equal to 20 percent of the original credit as taken for each year less than 5 full years that the property is held by the owner in a trade or business.

COMMUNICATIONS

STATEMENT OF THE ALLIANCE FOR RESOURCE EFFICIENT APPLIANCES

The Alliance for Resource Efficient Appliances (AREA) fully supports S.686, the "Resource Efficient Appliance Incentives Act." This bi-partisan appliance tax credit bill was introduced April 4, 2001 by Senator Blanche Lincoln (D–AR) and Senator Wayne Allard (R–CO). Current cosponsors include Senator Charles Grassley (R–IA), Senator Chuck Hagel (R–NE), Senator Tim Hutchinson (R–AR), Senator John Kerry (D–MA), and Senator Joe Lieberman (D–CT).

This proposed tax credit will provide a per unit tax credit for appliance manufacturers who produce clothes washers and refrigerators that exceed the current Department of Energy standards. The credit is subject to an aggregate per company limit of $60 million and an annual limit of two percent of corporate gross revenues as well as the following:

Washing Machines—Manufacturers of super energy-efficient washing machines would be eligible to claim a credit of either $50 or $100 for each super energy-efficient washing machine produced between 2002 and 2006. The $50 credit is available for units that use 35% less energy than the standard in place through 2003 and use 17% less energy than the standards announced by DOE. The $100 credit is available for units that use 42% less energy than the standard in place through 2004 and use 42.5% less energy through 2006 than the standards announced by DOE.

Refrigerators—Manufacturers of super energy-efficient refrigerators would be eligible to claim a credit of $50 for each super energy-efficient refrigerator produced between 2002 and 2004 that is at least 10% more energy efficient than the DOE required efficiency standard that went into effect on July 1, 2001. Manufacturers would be eligible to claim a credit of $100 for each unit produced between 2002 and 2006 that is at least 15% more energy efficient than the 2001 DOE required efficiency standard.

The tax credit for the production of super energy-efficient washing machines and refrigerators creates the incentives necessary for both manufacturers and consumers to increase the production and sale of super energy-efficient appliances in the short-term and to expand marketing opportunities. The more rapidly those super energy-efficient appliances appear in the marketplace; the more rapidly energy savings will occur. For example, as a result of making the tax credit available between 2002 and 2006, the production and purchase of super energy-efficient washers is estimated to increase by almost 200% and the purchase of super energy-efficient refrigerators by over 285%. Moreover, this increase in the purchase of super energy-efficient appliances will create a market transformation. The long term cost savings of increased energy efficiency will lead to a dramatic change in consumer purchasing decisions that will last many years after the expiration of this tax credit.

The expanded use of super energy-efficient appliances has significant long-term environmental benefits. Over the life of the appliances, over 200 trillion Btus of energy will be saved.[1] This is the equivalent of taking 2.3 million cars off the road or closing down 6 coal-fired power plants for a year. Energy savings of this magnitude pay significant environmental dividends. For example, carbon emissions, the critical element in greenhouse gas emissions, will be reduced by over 3.1 million metric tons. In addition, the super energy-efficient clothes washers will reduce the amount of water necessary to wash clothes by 870 billion gallons or approximately the amount of water necessary to meet the needs of every household in a city the size of Phoenix, Arizona for two years. The net benefits to consumers over the life

[1] Of the total, approximately 150 trillion Btus are attributable to the super energy-efficient clothes washers and approximately 40 trillion Btus are attributable to super energy-efficient refrigerators.

of the super energy-efficient clothes washers and refrigerators from operational savings is almost $1 billion.

The appliance industry and the advocacy organizations acknowledge that substantial energy savings are being achieved today through the use of more energy efficient appliances. However, industry has the technological ability to achieve even greater energy savings if properly crafted incentives are enacted to encourage greater consumer receptivity to the super energy-efficient appliances. Currently, a major hurdle to the more widespread use of the super energy-efficient clothes washers and refrigerators is the reluctance of many consumers to make a higher initial investment in order to receive the long term savings of the super energy-efficient appliances.

A tax credit available to manufacturers for the production of super energy-efficient washing machines and refrigerators can overcome much of the consumer reluctance by creating incentives for both manufacturers and consumers that will increase sales of super energy-efficient appliances. A credit provided at the manufacturers' level is preferable to a credit at the consumer level because of—(1) the ease of administration; (2) the ability to limit the cost of the proposal by capping the benefits; (3) the higher leverage obtained by providing the tax credits upstream; and 4) the flexibility to select among many means of marketing for the best way to sell more energy-efficient appliances.

AREA Members Include:

Alliance to Save Energy
American Council for an Energy-Efficient Economy
Association of Home Appliance Manufacturers
Appliance Standards Awareness Project
The Business Council for Sustainable Energy
California Energy Commission
City of Austin, Texas
Friends of the Earth
Natural Resources Defense Council
Northwest Power Planning Council
Pacific Gas and Electric
The Sierra Club

STATEMENT OF THE AMERICAN PETROLEUM INSTITUTE, THE DOMESTIC PETROLEUM COUNCIL, AND THE US OIL & GAS ASSOCIATION

I. INTRODUCTION

These comments are submitted by the American Petroleum Institute (API), the Domestic Petroleum Council, and the US Oil & Gas Association for inclusion in the record of the July 11, 2001 Senate Finance Committee Hearing on the role of tax incentives in energy policy. API represents 400 member companies involved in all aspects of the oil and gas industry, including exploration, production, transportation, refining, and marketing. The Domestic Petroleum Council is a national trade association representing 22 of the largest U.S. independent natural gas and crude oil exploration and production companies. The US Oil & Gas Association represents more than 2000 members of all sizes involved in the exploration and production of oil and natural gas.

Last year, and again this spring, U.S. energy consumers experienced sudden increases in oil and gas prices, and regional price volatility in response to events such as unusual weather, difficulties in producing regional gasoline blends, and refinery and transportation interruptions. With the President's national energy strategy proposals joining those from Democrat and Republican members of Congress, Americans will benefit from the long-neglected national debate now underway concerning our nation's energy future. Recent events affecting energy supplies and prices also serve as a reminder that oil and natural gas remain essential to fueling the growth of both the U.S. and the world economies, and measures to ensure sufficient quantities of these products must be part of any U.S. energy plan. Together, oil and natural gas supply more than 60 percent of U.S. and world energy needs, and their role in fueling future economic growth is expected only to increase.

The Department of Energy's (DOE) most recent International Energy Outlook estimates that by 2020, world energy demand will be almost 60 percent higher than in 1999. Three-quarters of that total energy demand growth is expected to be for oil and gas, so that the share of oil and gas in the global energy mix will rise to 68 percent by 2020. An ever-increasing share of this growth, especially in the United States, is expected to be for natural gas due to its comparative energy efficiency, clean burning characteristics, and abundance of potential supplies in North America.

From strictly a world resource standpoint, there is no reason to doubt that the resource base is adequate to satisfy expected growth in energy demand for well beyond the next several decades. Advanced technology has greatly increased industry's ability to pursue the development of new oil and natural gas reserves without adverse environmental impact. Nevertheless, there are a number of sobering challenges that must be met in order to satisfy our country's future energy needs.

These challenges stem not from resource scarcity, but from self-imposed policy restrictions on accessing key remaining domestic supply prospects, policies that have deterred adequate U.S. downstream infrastructure investment, resurgence of OPEC market power in global oil markets, and regulations that have diminished the flexibility of the existing infrastructure to respond effectively to unexpected events. In addition, the technology and increasingly sophisticated production methods necessary to secure adequate supplies of oil and natural gas are expensive and will require huge capital investments by U.S. oil and gas companies. For example, the National Petroleum Council projects that producers will have to invest some $650 billion through 2015 in order to meet the anticipated growth in U.S. natural gas demand alone.

Downstream, the refining industry has long been able to meet its objective of supplying American consumers with readily available, reasonably priced petroleum products. However, massive investments will be required in the next ten years both to expand refinery capacity to meet growing demand and offset the production loss resulting from more stringent product quality specifications and possible refinery closures. Combined with the historically low rates of return in refining, the size of these investments will make the task of expanding refinery capacity increasingly difficult in the future. The number of refineries in the U.S. peaked in 1981, when there were 315 operating refineries in the United States. Many of these closed in the 1980s and 1990s, and there are now only 152 refineries operating in this country. Fortunately, despite the fact that no new U.S. refinery has been built since 1976, growth in capacity at existing refineries has offset the effect of refinery closures with the result that total refinery capacity grew from 15.5 to 16.5 million barrels per day in the 1990s. Nevertheless, this increase has not been adequate to keep up with the growth in petroleum product demand, and refinery utilization rates are now approaching 100 percent.

While the United States has a strong strategic and economic interest in maintaining a vibrant domestic oil and gas industry, we also need a wide diversity of international supplies. Over the last 30 years, imports as a percentage of U.S. petroleum deliveries have risen from 23.3 percent to almost 60 percent during the first part of this year. As our reliance on global oil markets has grown, we have learned that this dependence carries both opportunities and risks. On the one hand, it affords us access to energy supplies less costly than could be produced domestically. On the other hand, it exposes us to two inherent risks associated with that marketplace, namely the potential for short-term supply interruptions, and the potential for long run vulnerability to adverse actions by OPEC.

Recognizing that 90 percent of the world's proven oil reserves are in the hands of foreign government-controlled oil companies (more than two-thirds of those are in the Middle East), U.S. energy security is best served by U.S. companies being competitive participants in the international energy arena. . However, the ability of the U.S. oil and gas industry to compete globally is currently hampered by the unintended consequences of two sets of U.S. policies, namely the adverse tax treatment of foreign source income earned by U.S. companies operating overseas, and the persistent tendency of the United States to utilize unilateral economic sanctions against oil producing countries as an instrument of foreign policy. The U.S. international tax regime imposes a substantial economic burden on U.S. multinational companies, and to an even greater degree on U.S. oil and gas companies, by exposing them to potential double taxation, that is, the payment of tax on foreign source income to both the host country and the United States. In addition, the complexity of the U.S. tax rules imposes significant compliance costs. As a result, U.S. oil and gas companies are forced to forego foreign exploration and development projects based on lower projected after-tax rates of return, or they are preempted in bids for overseas investments by global competition not subject to such complex rules.

Recent events should serve as a wakeup call for the United States to adopt a national energy policy, which includes revised tax rules, that begins to tear down the barriers to development of oil and natural gas supplies at home, supports necessary international risk taking and encourages the tremendous capital investment that will be needed to meet U.S. and global energy demand growth.

While most other countries encourage energy development, flawed public policies—especially excessive restrictions on access to federal lands and unreasonably burdensome regulations—continue to place substantial restrictions on our ability to explore for, produce, refine and transport oil and gas in this country. Moreover, continued high corporate tax rates and an obsolete cost recovery regime limit the capital available to U.S. oil and gas companies at the very time huge investments in both exploration and production and refining capacity must be made to meet future energy needs. As with all industries, the after-tax economics of oil and gas development projects determines whether or not those investments will be made. The most important thing Congress and the Administration can do is enact a national energy plan that will change these policies to promote the economic and environmentally sound recovery of domestic reserves, increased U.S. refining capacity, and an expanded nationwide oil and gas pipeline network.

In 1999, a united oil and gas industry proposed a series of tax changes designed to spur domestic oil and gas production. The need for these changes has only intensified over the last couple of years as OPEC has reestablished its ability to profoundly impact the available supply of oil—and most importantly, the price paid by consumers.

While not the sole answer to ensuring adequate oil and gas supplies for U.S. energy consumers, tax measures such as the expensing of geological and geophysical (G&G) costs and delay rental payments, a marginal domestic oil and natural gas well production credit, eliminating limitations on use of percentage depletion of oil and gas by independent producers, and Alternative Minimum Tax (AMT) relief will promote greater U.S. exploration and production. Most of these items were previously adopted by both the House of Representatives and the Senate as part of the conference report to the Taxpayer Refund and Relief Act of 1999 (H.R. 2488), which was ultimately vetoed by former President Clinton. Other provisions, including an expansion of the enhanced oil recovery (EOR) credit to include certain nontertiary recovery methods and a heavy oil production credit, would further encourage increased domestic petroleum activity.

Finally, while it is vitally important to promote increased oil and gas production, it is equally important that we maintain an adequate refining and pipeline transportation infrastructure to ensure that sufficient quantities of our industry's finished products will be available when and where they are needed. Modifying the depreciation lives for refinery assets, oil and gas pipelines and storage tanks by making them more consistent with other manufacturing assets will help promote the tremendous investment needed in these areas.

Many of these proposals continue to enjoy bipartisan support and have been included in numerous bills that have been introduced in both the House and Senate. Moreover, most of these provisions are included in one or both of the two national energy plans pending in the Senate—S 389, introduced by Sen. Murkowski on February 26, 2001, and S. 596, introduced by Sen. Bingaman on March 22, 2001.

Geological and Geophysical Expenses

Oil and gas exploration companies incur huge up front capital expenditures, including geological and geophysical (G&G) expenses, in their search for new oil reserves. G&G expenses include costs incurred for geologists, surveys, and certain drilling activities, which help oil and gas companies locate and identify properties with the potential to produce commercial quantities of oil and/or gas. Currently, these costs must be capitalized, suspended and then amortized over a period of years in the form of cost depletion after production begins. Forcing oil and gas companies to capitalize G&G costs exacerbates the economic burden imposed by these significant cash outlays that must be made prior to or at the beginning of an exploration project.

Delay Rentals

Delay rentals are paid by oil and gas exploration companies to defer the commencement of drilling on leased property without forfeiting the lease. Treasury regulations and case law clearly supported the option to expense or capitalize delay rental payments. However, with the 1986 enactment of the Section 263A uniform capitalization rules, the IRS began to challenge the deductibility of delay rentals during audits. In 1997, the IRS unequivocally adopted the position that for tax years beginning after December 31, 1993, delay rentals had to be capitalized unless the taxpayer could establish that the lease was acquired for some reason other than development. This position ignores forty years of history and long-established regulations. Congress should pass legislation that clarifies and reaffirms the long-standing rule that delay rentals be expensed rather than capitalized. By permitting a cur-

rent deduction for both delay rentals and G&G costs, more capital will be available for new outlays that otherwise wouldn't be available for extended periods of time.

In addition to having been included in the vetoed 1999 tax bill, proposals to expense both G&G costs and delay rental payments are included in both S. 389 and S. 596. Even former President Clinton expressed support for these tax provisions in his March 2000 proposal to "strengthen America's energy security."

Marginal Well Production Credit

A marginal well production credit of $3 per barrel for the first three barrels of daily production from an existing marginal oil well, and a 50 cent per thousand cubic feet (Mcf) tax credit for the first 18 Mcf of daily natural gas production from a marginal gas well, would help producers ensure the economic viability and survival of marginal wells. Like the proposed AMT relief, the credits would phase out as oil and natural gas prices rise to an economically viable level. Finally, the credit should be allowed against both regular and alternative minimum tax and to be carried back ten years. A marginal oil and gas well production credit proposal is included in both S. 389 and S. 596.

Percentage Depletion

Another way Congress could assist independent producers is to permit, by annual election, elimination of the 65 percent taxable income limitation on percentage depletion, as well as elimination of the 100 percent net income limitation. Moreover, independent producers and royalty owners should be permitted to carry back percentage depletion deductions for ten years. These proposals are included in S. 389.

Alternative Minimum Tax

The AMT was intended as an advance payment of federal income tax, and therefore, AMT payments are creditable in future years, though only against regular tax liability and not the taxpayer's tentative minimum tax. However, companies within the capital intensive petroleum industry often find themselves in a position where they are consistently unable to use their AMT credits because their regular tax liability in subsequent years does not exceed their tentative minimum tax for those years. For those companies, the AMT constitutes a permanent tax increase and decreases the economic viability of certain domestic operations.

Recently, the problems associated with the AMT have again been all too real for many domestic oil and gas producers. Oil and gas drilling activity has accelerated rapidly since 1999 in response to the phenomenal growth in demand for oil and natural gas. However, a portion of this activity had to be curtailed, not because of a lack of product demand, but, rather, because the AMT preference item for intangible drilling and development costs (IDCs) exposed those producers to the AMT and rendered some of that additional drilling activity uneconomic. In other cases, producers were not in an AMT position because their regular tax liability exceeded their tentative minimum tax. However, the ability of those producers to utilize accumulated AMT credits was diminished due to a higher tentative minimum tax amount resulting from the IDC preference item. In both instances, the AMT served to restrict new oil and gas drilling activity at the very time the nation was seeking to spur oil and natural gas production.

Some of the AMT's most discriminatory provisions are targeted at the U.S. oil and natural gas industry. In order to reverse this inequity and promote capital investment in the oil and gas sector, Congress should, at a minimum, eliminate the preference for IDCs, fully eliminate the depreciation adjustment for oil and gas assets, eliminate the impact of IDCs from the Adjusted Current Earnings (ACE) adjustment, and permit the EOR and Section 29 credits to reduce tentative minimum tax. This proposed AMT relief would phase in and out as oil and natural gas prices fall and rise between specified levels, thereby providing the greatest assistance to producers in times of low prices.

Another non-industry specific way to mitigate the adverse impact of the AMT would be to allow AMT credits to be applied against future tentative minimum tax. This specific provision was included in the vetoed 1999 tax bill.

EOR Credit

The Enhanced Oil Recovery (EOR) credit provides a credit equal to 15 percent of costs attributable to qualified enhanced oil recovery projects. Since the enactment of the EOR credit in 1990, new technologies have greatly enhanced the ability of oil producers to economically recover additional domestic reserves from existing wells with minimal environmental impact. By extending the EOR credit to certain nontertiary production methods such as horizontal drilling, gravity drainage, cyclic gas injection, and water flooding, the economic viability of these oil recovery methods would be greatly enhanced. In turn, the up to 70 percent of an oil well's reserves

that otherwise would be left in the ground could be added to the nation's available energy supply.

Heavy Oil Production Credit

So-called "heavy oil" is one source of domestic petroleum that is significantly less economic, but represents a key component of the U.S. energy base. Currently, heavy oil accounts for over 11 percent of U.S. production. However, its potential is far more significant because the measured U.S. heavy oil resource base is over 100 billion barrels. Heavy crude oil is generally characterized by its high specific gravity or weight, as well as its high viscosity or resistance to flow. Because of these characteristics, heavy oil is substantially more difficult and expensive to extract and refine than other types of oil. Additionally, this oil is less valuable because a smaller percentage of high-value petroleum products can be refined from a barrel of heavy oil than from a barrel of higher quality crude oil. A heavy oil production tax credit would help the nation maximize its domestic energy supply by making that resource economic to produce.

Depreciation of Refineries, Pipelines and Storage Tanks

The Administration's development of a National Energy Policy and recent gasoline price increases have drawn attention to the fact that U.S. demand for refined petroleum products exceeds the domestic refining capacity to produce them. Among the solutions to this problem is to have government policies in place that create an environment conducive to refinery capacity expansion investments. One option for doing so is eliminating the currently outdated tax treatment of refinery investments.

Most manufacturing assets are depreciated over five or seven years. Despite substantial changes in the refining business and considerable investment made during the last decade, refinery assets are still subject to a 10-year depreciation schedule. The longer recovery period for refinery capital assets results in a depreciation deduction present value that is 17 percent to 25 percent less than that for other manufacturing assets and thus reduces the incentive to invest in refinery capacity expansion projects. Shortening the depreciation life for refinery assets to five years will reduce the cost of capital and remove the current bias in the tax code against needed refinery capacity expansion.

In addition to refineries, substantial investments will be needed in the nation's oil and natural gas pipeline system, as well as in new petroleum storage facilities. The present law 15-year depreciation life for pipelines denies an adequate cost recovery for tax purposes. In the case of gas gathering lines, which carry natural gas from the well to the processing plant or trunk line, the proposal to permit 7-year depreciation, as provided for in S. 389, would merely clarify their status as lease and well equipment. Contrary to an appellate court decision, the IRS currently challenges that classification in certain circumstances.

Under antiquated IRS classifications (dating from the early 1960s), petroleum storage facilities are depreciated over 5 years or 15 years, depending on whether the IRS considers them to be movable property. This demarcation is difficult to administer, depends on factors unrelated to useful life, and easily penalizes the economics of a project, often retroactively on tax audit. The assurance of 5-year depreciation for such facilities will increase the tax deduction's present value and improve project economics. All of these depreciation changes, which are similar to proposals included in S. 389, will help spur the investment needed to assure the maintenance of an adequate and environmentally safe pipeline transportation system and petroleum storage facilities.

III. RELIEF FROM DISCRIMINATORY INTERNATIONAL TAX RULES

In order to survive, the oil and gas industry must operate where it has access to economically recoverable oil and gas reserves. Since the opportunity for domestic reserve replacement has been substantially restricted by federal and state government policies, the tax treatment of international operations is critical to maintaining global supply diversity and ensuring the industry's continued ability to supply the nation's hydrocarbon energy needs. Therefore, while federal tax policy should promote domestic oil and gas production and an adequate refining and transportation infrastructure, it should also seek to enhance the competitiveness of U.S. companies operating abroad. The following tax changes would help enable U.S. companies operating overseas to better compete in the global oil and gas marketplace.

The Foreign Tax Credit Rules Need Reform

Since the beginning of federal income taxation, the U.S. has taxed the worldwide income of U.S. citizens and residents, including U.S. corporations. The FTC was intended to allow a dollar for dollar offset against U.S. income taxes for taxes paid

to foreign taxing jurisdictions in order to avoid double taxation of that income earned abroad. However, the many limitations on the FTC in our current rules often results in U.S. taxpayers paying tax on the same items of income in more than one jurisdiction.

The FTC is intended to offset only U.S. tax on foreign source income. An overall limitation on currently usable FTCs is computed by multiplying the tentative U.S. tax on worldwide income by the ratio of foreign source income to worldwide taxable income. However, since enactment of the Tax Reform Act of 1986, the overall limitation must be computed separately for not less than nine "separate limitation categories" or "baskets." Some of the separate limitations apply for income: (1) whose foreign source can be easily changed; (2) which typically bears little or no foreign tax; or (3) which often bears a rate of foreign tax that is abnormally high or in excess of rates of other types of income. In these cases, a separate limitation is designed to prevent the use of foreign taxes imposed on one category to reduce U.S. tax on other categories of income. There are other examples of normal active-business types of income that also must be calculated separately. Examples of these normal business-types of foreign source income include dividends received from 10/50 companies (i.e., foreign companies owned between 10 percent and 50 percent by U.S. owners), gains on the sale of foreign partnership interests, and payments of interest, rents and royalties from non-controlled foreign corporations and partnerships.

Section 907: Foreign Oil and Gas Extraction Income and Foreign Oil Related Income

Under the separate basket rules, foreign oil and gas income falls into the general limitation basket. But before determining this limitation for general operating income, U.S. oil and gas companies must first clear an additional tax credit hurdle.

Internal Revenue Code Section 907 limits the utilization of foreign income taxes on foreign oil and gas extraction income (FOGEI) to that income multiplied by the current U.S. corporate income tax rate. The excess credits may be carried back two years and carried forward five years, with the creditability limitation of Section 907 being applicable for each such year.

Congress intended for the FOGEI and foreign oil related income (FORI) rules to purport to identify the tax component of payments made by U.S. oil companies to foreign governments. The goal was to limit the FTC to that amount of the foreign government's "take" which was perceived to be a tax payment versus a royalty paid for the production privilege. But even the so-identified creditable tax component of those payments should not be used to shield the U.S. tax on certain low-taxed other foreign income.

These concerns have been adequately addressed in subsequent administrative rulemaking and legislation. In 1983, after several years of discussion and drafting, Treasury completed the "dual capacity taxpayer rules" of the FTC regulations, which determine how much of an income tax payment to a foreign government will not be creditable because it is a payment for a specific economic benefit. Such a benefit could, of course, also be derived from the grant of oil and gas exploration and development rights. These regulations have worked well for both IRS and taxpayers in various businesses (e.g., foreign government contractors), including the oil and gas industry.

Since concerns underlying Section 907 have been adequately addressed in subsequent legislation and rulemaking, that tax code provision has been rendered obsolete. Furthermore, Section 907 has raised little, if any, additional tax revenue because excess FOGEI taxes would not have been needed to offset U.S. tax on other foreign source income. Nevertheless, oil and gas companies continue to be subject to burdensome compliance work. Each year, they must separate FOGEI from FORI and the foreign taxes associated with each category. These are time consuming and labor intensive analyses, which have to be replicated on audit. As was done in the vetoed H.R. 2488, Section 907 should be repealed as obsolete. This would promote simplicity and efficiency of tax compliance and audit with minimal loss of revenue to the government.

Allocation of Interest Expense

Current law requires the interest expense of all U.S. members of an affiliated group to be apportioned to all domestic and foreign income, based on assets. This denies U.S. multinationals the full U.S. tax benefit from the interest incurred to finance their U.S. operations.

In addition, unless allocation based on fair market value of assets is elected, allocation of interest expense according to the adjusted tax bases of assets generally assigns too much interest to foreign assets. For U.S. tax purposes, foreign assets generally have higher adjusted bases than similar domestic assets because domestic assets are eligible for accelerated depreciation while foreign-sited assets are assigned

a longer life and limited to straight-line depreciation. For purposes of the allocation, the earnings and profits (E&P) of a CFC is added to the stock basis, and the cost basis in stock does not depreciate. Since the E&P reflect the slower depreciation, the interest allocated against foreign source income is disproportionately high.

Rules similar to the Senate version of interest allocation in the Tax Reform Act of 1986, as well as those included in the vetoed 1999 tax bill, would help to alleviate these current anti-competitive results. The allocation group would then include all companies that otherwise would be eligible for U.S. tax consolidation, but for their being foreign corporations. Additionally, "stand alone" subsidiaries could then elect to allocate interest on certain qualifying debt on a mini-group basis, i.e., looking only to the assets of that subsidiary, including stock.

At the very least, taxpayers should be allowed to elect to use the E&P bases of assets, rather than the adjusted tax bases, for purposes of allocating interest expense. Use of E&P basis would produce a fairer result because the E&P rules are similar to the rules now in effect for determining the tax bases of foreign assets.

Foreign Tax Credit Carryover Rules

Excess FTCs can be carried back to the two preceding taxable years, or to the five succeeding taxable years, subject in each of those years to the same overall limitation. Excess credit positions are frequent because of the ever-increasing limitations on the use of FTCs, coupled with the differences in income recognition between foreign and U.S. tax rules. Credits are often lost, most likely resulting in double taxation. A practical proposal to help reduce the existing risk of double taxation would permit five-year carryback and 15-year carryforward periods for excess FTCs. At the very least, a two-year carryback and 20-year carryforward period would provide greater consistency within the tax code by aligning the FTC carryover periods to those provided for net operating losses.

Dividends Received from 10/50 Companies

The 1997 Tax Act repealed the separate basket rules for dividends received from each 10/50 company, effective after the year 2002. A separate FTC basket will be required for post-2002 dividends received from pre-2003 earnings. When fully implemented, the repeal will remove significant complexity and compliance costs for taxpayers and foster their global competitiveness.

The repeal of the separate limitation basket requirement should be accelerated. The requirement of maintaining a separate limitation basket for dividends received from earnings and profits accumulated before the repeal should be eliminated. These provisions were included in the last few Clinton Administration budget proposals, as well as in the vetoed 1999 tax bill, H.R. 2488.

Look-through Treatment for Sales of Partnerships

The distributive share of an at least 10 percent U.S. partner of a foreign partnership follows the partnership's income FTC basket classification. On the other hand, the gain from such an interest is treated as separate basket passive income, thereby limiting the opportunity of FTC utilization. This is not only inequitable but also counterintuitive for the legal form of the value realization to control the FTC basket characterization. Accordingly, for a 10 percent or greater partnership interest, look-through treatment should apply to the gain in the same way that it applies to the distributive share of partnership income.

Look-through Treatment for Interest, Rents, and Royalties with Respect to Non-Controlled Foreign Corporations and Partnerships

U.S. oil and gas companies are often unable, due to government restrictions or operational considerations, to acquire controlling interests in foreign partnerships or corporate joint ventures. Look-through treatment for interest, rents and royalties received from foreign joint ventures should be available, as it is in the case of distributions from a controlled foreign corporation (CFC).

Recapture of Overall Domestic Losses

When foreign source losses reduce U.S. source income (overall foreign loss or OFL) in a tax year, the perceived tax benefit has to be "recaptured" by resourcing foreign source income in a subsequent tax year as domestic source income. However, if foreign source income is reduced by U.S. source losses, there is no parallel system of "recapture." Taxpayers are not allowed to recover or recapture foreign source income that was lost due to a domestic loss, resulting in the double taxation of such income. Only a corresponding re-characterization of future domestic income as foreign source income will reduce the risk that FTC carryovers do not expire unused.

IV. SUMMARY

Our industry strongly supports tax law changes designed to encourage increased domestic petroleum activity, which, in turn, will help to expand overall product supply in the United States. Expansion of available supply is critical to meeting DOE projections of a 33 percent increase in U.S. petroleum demand and a more than 50 percent increase in U.S. natural gas demand by 2020. Existing tax laws do not begin to address how this nation will encourage the massive capital investment needed to meet this energy demand growth. Positive tax changes will help promote the use of new technologies for exploration, development and production, help maintain the economic viability of mature production sites, and develop urgently needed new refining capacity. Notwithstanding the positive effects of these new tax provisions, their potential to help increase and sustain domestic petroleum production will be limited unless Congress also acts to reduce restrictions on access to federal lands and to rationalize the increasingly burdensome regulatory apparatus imposed on all segments of the industry. Moreover, it must be recognized that expected growth in U.S. demand for oil and natural gas cannot be met merely through increased U.S. production. While U.S. reliance on imported oil can be reduced, restoring the global competitive position of the U.S. oil and gas industry through changes in U.S. international tax policy will be crucial to ensuring that U.S. consumers continue to enjoy adequate and affordable supplies of our industry's major products.

STATEMENT OF THE AMERICAN PUBLIC GAS ASSOCIATION

[SUBMITTED BY BOB CAVE, EXECUTIVE DIRECTOR]

The American Public Gas Association submits this testimony in support of S. 726, The Municipal Utility Gas Supply Act of 2001. This legislation, which has been introduced by Senator Breaux and 8 other Senators, would clarify the treatment of tax-exempt bonds used to fund long term prepaid contracts for natural gas.

BACKGROUND ON APGA AND MUNICIPAL GAS SYSTEMS

APGA is the national association of municipally owned natural gas distribution systems, with some 570 members in 36 states. Overall, there are nearly 1,000 municipally owned natural gas systems in the United States, serving approximately 4.8 million customers or about 5% of the national market for gas.

Municipally owned gas systems are not-for-profit retail gas distribution entities that are owned by, and accountable to, the citizens they serve. They include municipal gas distribution systems, gas and other public utility districts, county districts, and other public agencies that own and operate natural gas distribution facilities. We refer to these systems as "Municipal LDCs". Although they are located throughout the nation, municipal gas systems are most prevalent in the Southeast, and within the Southeast mostly in small towns.

Municipal LDCs generally serve a mix of residential, commercial and industrial customers. The service provided by most Municipal LDCs to their customers is predominantly firm service, which means that natural gas deliveries as a practical matter can never be interrupted. The reliability of service is of paramount importance, since natural gas is used mostly to provide heat to homes, hospitals and schools.

As departments or enterprises of governmental units, Municipal LDCs operate under different principles than do for-profit, investor-owned corporations. As a general matter, governmental units operate in a conservative, risk-averse manner and do not enter into transactions that may have the potential of generating substantial profits but which also expose public funds and capital investments to substantial risk of loss. As applied to Municipal LDCs, this principle would foreclose in most instances consideration of certain transactions that would be considered by private companies in obtaining gas supplies, such as the various means of purchasing natural gas in the ground, due to the production risks associated with such transactions. As a general rule, Municipal LDCs in the deregulated supply market are seeking, and will continue to seek, to obtain their natural gas supplies through contractual arrangements containing appropriate security provisions with reputable, substantial suppliers of natural gas, whether producers or aggregators/marketers.

REGULATORY AND MARKET CHANGES

In 1993, the Federal Energy Regulatory Commission ("FERC") restructured the natural gas industry so that municipal LDCs could no longer purchase natural gas supplies from interstate natural gas pipelines. This fundamental change in the marketplace meant that for the first time municipal LDCs both had to acquire reliable

gas supplies and transport those supplies on their own in a deregulated marketplace. In response, many formed joint action agencies—as contemplated in the FERC restructuring—to acquire and manage the delivery of gas.

Joint action agencies provide a range of services to municipal LDCs to assist them with their responsibilities to provide an assured supply of competitively priced natural gas to their customers. The preferred means of fulfilling these responsibilities in today's gas markets is through long-term prepaid contracts financed with the proceeds from tax-exempt bonds. The joint action agency deals directly with the gas supplier negotiating the terms of the prepaid, long-term contract for the delivery of natural gas. These contracts are typically for ten-year terms. The contract with the supplier is for a fixed price based on the market conditions at the time of the contract. In most cases, the parties then enter into a swap agreement with a third party financial institution where the fixed price is converted to a monthly indexed price as the gas is delivered.

The municipal LDCs enter into swap agreements because as public bodies, accountable to their citizens, they prefer to avoid the risk associated with purchasing long term gas at fixed prices. For example, they want to avoid a situation where they have a supply of gas that was purchase at $5.00 per MMBtu when the current market price is at $3.00 per MMBtu. In such case, the municipal LDC risks incurring substantial losses, as well as the loss of industrial customers, where they have purchased gas at one price and the market price is considerably less.

IRS ACTION

In August 1999, in the preamble of unrelated proposed regulations, the Internal Revenue Service (IRS) published a request for comments that has effectively prevented municipal LDCs from using their tax-exempt borrowing authority to fund the purchase of long-term, prepaid supplies of natural gas for their citizens. In the preamble statement, the IRS questioned whether the purchase of a commodity, such as natural gas, under a prepaid contract financed by tax-exempt bonds has a principal purpose of earning an investment return. If this were the case, the bonds could run afoul of the arbitrage rules of the Internal Revenue Code.

This action, together with the treat of retroactive action, has effectively prevented the issuance of tax-exempt bonds to fund long-term prepaid contracts for natural gas. Municipal LDCs, and the joint action agencies which represent them, have resorted to the use of short-term contractual arrangements or have issued taxable bonds. Other than to hold a hearing in January of 2000, and to threaten retroactive regulations, the IRS has not made any public statements nor taken any further steps toward the issuance of further guidance to clarify current law or adopt new rules.

This has seriously impeded the gas supply planning efforts of municipal gas systems throughout the United States. Meanwhile, during this period the natural gas markets have been in turmoil, as supply has not kept up with growing demand. As a result, prices have reached record levels and supply disruptions have occurred throughout the country. While prices have currently settled down because of the seasonal drop in demand, uncertainties continue in the natural gas markets.

S. 726

S. 726 does not overturn current law nor change any IRS regulation. It simply restates the law as it has been understood for years, both with respect to the arbitrage rules and the private loan financing rules, to allow an effective and reasonably-priced energy delivery system to continue unimpeded. The legislation provides that a prepayment contract for the purchase of natural gas reasonably expected to be used in the business of a governmentally owned utility is not investment property under the arbitrage rules. It would also clarify that prepayment contracts for the purchase of natural gas reasonably expected to be used in the business of a public utility do not create a loan of the bond proceeds to the gas supplier for purposes of the private loan financing test. Although no current issue exists with respect to the private loan financing test, this change is include to deal with any potential attempt by the IRS to characterize prepaid natural gas contracts for public utilities as private loan financings. The existing Treasury regulations relating to the treatment of prepayments under the private loan financing rules contain basically the same standard as the existing Treasury regulations relating to the treatment of prepayments under the arbitrage rules.

CURRENT LAW

Investment Type Property. Section 103(a) of the Internal Revenue Code of 1986 (the "Code") provides that interest on an obligation of a State or local government

is not included in gross income. Section 103(b) of the Code provides an exception to this general rule under which interest on any arbitrage bond is not tax-exempt. Section 148 of the Code, in turn, defines an arbitrage bond as a bond issued as part of an issue any portion of the proceeds of which are reasonably expected to be used directly or indirectly to acquire higher yielding investments. With one important exception, these general rules have not changed since 1969, when the arbitrage bond prohibition was first added to the Internal Revenue Code of 1954 (the "1954 Code").

Under the 1954 Code, the only types of investments that were subject to the arbitrage restrictions were "securities or obligations." As a result, under the 1954 Code, the investment of bond proceeds in investments other than securities or obligations did not result in the loss of tax-exempt bond status. The terms "security" and "obligation" were relatively narrowly defined under the applicable regulations.

As part of the enactment of the Tax Reform Act of 1986 (the "1986 Act"), Congress expanded the arbitrage limitations applicable to tax-exempt bonds in a variety of ways. One specific change was to expand the types of investments that are subject to the arbitrage restrictions. This was accomplished by providing that the acquisition of "higher yielding investments" result in arbitrage bond status. Under the Code, the term "higher yielding investments" is defined as any "investment property" that produces a yield over the term of the bond issue that is materially higher than the yield on that bond issue. "Investment property" was, in turn, defined to include securities, obligations, annuity contracts, and any "investment-type property." The term "investment-type property" is not defined by the Code, although Congress did provide some guidance on the meaning of this term in the legislative history to the 1986 Act. The General Explanation of the Tax Reform Act of 1986 prepared by the staff of the Joint Committee on Taxation includes a reference to prepayments in a reference on page 1202: "Congress was aware that bond proceeds might be used to prepay items as a means to avoid arbitrage restrictions, and intended for the Treasury Department to adopt rules to treat such prepayments as investment—type property where appropriate."

The regulations, 1.148–1(e), issued in June, 1993, include a definition of "investment-type property" that reads as follows:

> (e) Investment-type property—(1) In general. Investment-type property includes any property, other than property described in section 148(b)(2)(A), (B), (C), or (E), that is held principally as a passive vehicle for the production of income. For this purpose, production of income includes any benefit based on the time value of money, including the benefit from making a prepayment.

(2) Non-customary prepayment. Except as otherwise provide in this paragraph (e), a prepayment for property or services gives rise to investment-type property if a principal purpose for prepaying is to receive an investment return from the time the prepayment is made until the time the payment otherwise would be made. A prepayment does not give rise to investment-type property if—

> (i) The prepayment is made for a substantial business purpose other than investment return and the issuer has no commercially reasonable alternative to the prepayment; or
>
> (ii) Prepayments on substantially the same terms are made by a substantial percentage of persons who are similarly situated to the issuer but who are not beneficiaries of tax-exempt financing.

Private Loan Financing. Section 141 of the Code includes rules for purposes of determining if a bond is a private activity bond. A bond will be considered to be a private activity bond if the "private loan financing" test set out in section 141(c) of the Code is met. The test is met if more than a certain amount of the proceeds of the issue are used, directly or indirectly, to finance a loan to a person other than a governmental unit. The General Explanation of the Tax Reform Act of 1986 prepared by the staff of the Joint Committee on Taxation provides on page 1166 that "a loan may arise—from transactions in which indirect benefits that are the economic equivalent of a loan are conveyed." That discussion goes on to describe circumstances in which a lease, management contract, or output contract may in substance constitute a loan of bond proceeds. There is no discussion whatsoever of prepayments by the governmental entity and the situations described have no relationship to contracts under which a governmental entity purchases a needed commodity or service.

Nevertheless, the regulations interpreting the private loan financing test, 1.141–5(c)(2)(ii), provide that certain prepayments will be treated as loans if "a principal purpose for prepaying is to provide a benefit of tax-exempt financing to the seller. A prepayment is not treated as a loan for purposes of the private loan financing test if——

(A) The prepayment is made for a substantial business purpose other than providing a benefit of tax-exempt financing to the seller and the issuer has no commercially reasonable alternative to the prepayment; or

(B) Prepayments on substantially the same terms are made by a substantial percentage of persons who are similarly situated to the issuer but who are not beneficiaries of tax-exempt financing.

This language is substantially the same as the language used for purposes of the "investment-type property" test described above.

POSITION OF AMERICAN PUBLIC GAS ASSOCIATION

It has been our position, and that of bond counsel who have reviewed these transactions, that the existing arbitrage rules, as illuminated by their legislative history, do not prevent the prepaid purchase of natural gas by a municipal gas supply agency. Those rules were intended to target prepayment abuses, not prepaid natural gas supply contracts entered into by municipalities or their gas supply joint action agencies.

The use of tax-exempt financing to prepay long-term gas supply contracts is not prohibited arbitrage because: (1) receiving an investment return is not a principal purpose of the prepayments; and, (2) the prepayment is made for a substantial business purpose and the issuers have no commercially reasonable alternative. Furthermore, the use of tax-exempt financing to prepay long-term gas supply contracts is not private-loan financing because: (1) the prepayment is not made to provide a benefit of tax-exempt financing to the seller; and (2) the prepayment is made for a substantial business purpose and the issuers have no commercially reasonable alternative.

As noted above, S. 726 would not change current law or any IRS regulations, it would simply deal with the confusion created by the August 1999 IRS request for comment by clarifying the law to allow public gas systems to continue providing reasonably-priced energy to their customers.

Substantial Business Purpose and Commercially Reasonable Alternatives

Municipal LDCs have a duty to protect the general health and welfare of their customers, i.e., the citizens of their community, and therefore they cannot fail to deliver gas that heats homes, hospitals, schools, businesses, and factories. The security, reliability, and adequacy of natural gas supplies are the paramount concern for these gas distributors. In a partially deregulated industry, supply security can be obtained only by contract. Prepaid gas contracts allow Municipal LDCs to obtain long-term supplies under a contract structure that often includes severe penalties if the supplier fails to perform. Such agreements have become the vehicle for the Municipal LDCs to acquire the most reliable gas supply possible.

In today's turbulent natural gas markets, long-term prepaid supply arrangements are the most reliable means of obtaining an assured supply of natural gas. To fund prepayment contracts, the municipality or the joint action agency issues tax-exempt bonds. The seller discounts the prepaid price for several reasons, including because the contract is prepaid, which eliminates the normal credit risk associated with selling gas to non-rated governmental entities. (The LDC's credit risk became even more of a limiting factor in the kind of high priced, volatile gas markets witnessed last winter.) Municipal LDCs are able to obtain these very firm gas supplies at more competitive prices. Until August of 1999, joint action agencies entered into prepayment supply contracts with gas suppliers to obtain a long-term (e.g., 10-year) supply of gas.

The law does not impose the arbitrage restrictions on all prepayment transactions funded with tax-exempt bonds. Rather, those restrictions only apply if a principal purpose of the transaction was arbitrage and there is no other substantial business purpose or evidence that the prepayment is a customary transaction. The approach taken by the IRS, Treasury, and Congress has been not to prohibit transactions where tax-exempt bond proceeds are used and a time value of money benefit results so long as there is a good business purpose or the transaction is customary. Passage of S. 1986 will preclude the IRS from changing this policy with respect to gas purchased by municipal LDCs.

The gas prepayment transactions at issue do not result in investment-type property. Without question, the principal purpose of municipal gas systems that have entered into gas prepayment transactions has not been arbitrage. The joint action agencies that have entered into prepaid gas transactions have two overriding purposes: (1) they must obtain a secure delivered supply of gas to meet their obligations to their members and other customers and (2) they must obtain delivered gas at competitive prices to ensure that their members can remain competitive. The gas

prepayment transactions are designed to meet these two goals, which also reflect the *raison d'etre* of these joint action agencies.

Municipal LDCs have concluded that these transactions are the best way to cope with deregulation of natural gas sales. They have not been able to assemble the benefits derived from a long-term, prepaid gas supply contract in any other sort of transaction. Sellers extract a substantial premium for the features of a prepaid contract when the gas is sold on a pay-as-you-go basis. Thus, many Municipal LDCs and joint action agencies have concluded that there is no commercially reasonable alternative to a prepaid gas contract.

Commodity Swaps

Some confusion has developed around this matter because of the use of commodity swaps in these transactions. A commodity swap is a price hedge that has become a widely used tool in the industry by both buyers and sellers of natural gas. Natural gas supply prices are extremely volatile. The risk of future changes in natural gas prices is great. It is not uncommon to see price swings of $1.00 to $2.00 per MMBtu from one month to the next. Protecting against price risk is commonplace in the natural gas industry. Producers, distributors and end-users regularly purchase natural gas price protection through swap agreements or natural gas futures contracts.

The fact that municipalities or municipal joint action agencies purchase separate protection to address their price risk does not add to, or take from, the analysis under the arbitrage regulations. The test is whether the natural gas supply prepayment is to earn an investment return. It is not. It is to obtain long-term, firm, secure natural gas supply to meet the obligations of the municipalities or agencies. The benefits of the natural gas supply prepayment are locked in by the up-front payment and are exactly the same whether or not the municipalities or agencies purchase the separate price protection.

CONCLUSION

Municipal LDCs have responded to the federally mandated restructuring of the natural gas industry in just the manner envisioned by the federal government. They have joined together into gas purchasing groups, and they have then developed a supply transaction that helps them compete. That transaction is consistent with the rules and the purposes that underlie those rules. There is no valid basis for prohibiting prepaid natural gas contracts funded by tax-exempt bond proceeds.

Although municipal gas systems clearly have a "substantial business purpose" for entering into prepayment transactions and "no commercially reasonable alternative," the IRS' failure to issue any guidance following its August 1999 request for comment has eliminated the most efficient tool available to public gas systems to secure long-term supplies of natural gas. Congress must step in and enact legislation clarifying the law.

STATEMENT OF THE AMERICAN PUBLIC POWER ASSOCIATION

[SUBMITTED BY GLENN CANNON, GENERAL MANAGER, WAVERLY LIGHT AND POWER]

Thank you for the opportunity to submit testimony regarding energy supply and tax issues. I am Glenn Cannon, General Manager of Waverly Light and Power a municipal utility located in Waverly, Iowa. This statement is provided on behalf of the American Public Power Association (APPA). APPA is the national service organization representing the interests of over 2,000 community-owned public power systems throughout the United States. APPA member systems account for more than 15 percent of all kilowatt-hour sales to ultimate consumers located in some of the nation's largest cities as well as in numerous small and medium-sized communities.

Waverly Light and Power serves 4,300 customers in the state of Iowa. This statement will focus on the wind energy that serves the equivalent of 15% of our residential customers. We estimate that our wind generation displaces 3,580 tons of carbon dioxide, 19 tons of sulfur dioxide and 12 tons of nitrous oxides per year in our community. Wind is becoming a success story for our customers and throughout Iowa, but it has been an uphill climb for our small municipal utility. This statement will explain why a tax credit (specifically a tradable tax credit) for renewable energy, including wind energy, that can apply to community-owned utilities is necessary to fulfill Congress' promise to treat all sectors of the electric industry—from small, rural, municipal systems to large investor-owned utilities—equitably. Moreover, making the credit available to all communities will bring more renewable energy supplies on line.

First, I want to provide some background regarding our involvement in wind energy. Waverly Light and Power was the first municipal utility in the Midwest to own wind generation. Our journey began ten years ago, when we undertook a feasibility study on wind. Amid skeptics that included other power companies and national organizations, we proved that wind was a viable resource in the state. We constructed an 80KW wind turbine, the first *utility-owned* and operated wind turbine in the Midwest.

I emphasize utility-owned because as a power company, we believe we can best serve our customers by owning and operating our own wind generation. We are committed to providing our customers clean energy options and are experienced in managing a portfolio of energy resources so that they can directly benefit our community and keep rates low.

We have since expanded our own supply of wind generation, and have assisted other municipalities and investor-owned utilities in Iowa with their projects, providing them with our experiences and the benefit of our feasibility study. For example, MidAmerican Energy, a major investor-owned utility in Iowa, has used our feasibility study in its own research on the potential to create a large wind farm near Altar.

Waverly Light and Power has also pioneered a program called "Iowa Energy Tags." Through this program, consumers throughout the world can purchase the environmental benefits of our clean wind energy in order to offset fossil fuel production and the related carbon dioxide and greenhouse gas emissions. The "tags" are sold in $50.00 increments; each increment represents 2500 kWh of wind generation—and a savings of 5300 lbs. of CO2 emissions and a host of other greenhouse gases.

Congress has seen clear benefit in providing incentives for emissions-free wind energy, and in 1992, enacted legislation known as the Energy Policy Act. This legislation provides a 1.5 cent per kWh production tax credit for generation from wind, biomass and poultry waste, which is adjusted for inflation. We applaud this Section 45 tax code provision, and urge Congress to extend it so that Iowa can continue to expand its wind resources.

But, the incentive is flawed. When Congress enacted the Energy Policy Act, it intended for municipal utilities and rural electric cooperatives, who have no federal income tax liability to offset, to receive an equivalent incentive for renewable energy production under an appropriations program called the Renewable Energy Production Incentive, or REPI. But as explained below, REPI has been and remains significantly underfunded. Congress has not fulfilled its promise under the Energy Policy Act of providing equivalent incentives for all segments of the electric industry.

For-profit developers and investor-owned utilities in Iowa receive an incentive to invest in the wind generation from the tax credit under section 45 of the tax code, and will more readily engage in the business of wind energy. But community-owned utilities like Waverly Light and Power, and the similarly situated rural electric cooperatives, can not receive this production credit. Our motivation to bring wind energy on line was to diversify the mix of fuels available to our customers, so we could make the most of generation resources that our geography affords.

With adequate generation of many types on line, our customers can be sheltered from price spikes of any one fuel type and supply shortages that are having a large impact in many parts of the country. But we receive no incentive comparable to that available to for-profit utilities.

I do not believe Congress intended to choose investor-owned utilities and private developers over public power systems and rural electric cooperatives when deciding which communities should benefit from wind, and how much they should benefit from wind. In fact, public power systems and rural electric cooperatives serve a full 25% of the nation's energy load! But our ability to expand to provide our customers with more of this clean energy is limited by an operating budget that is miniscule compared to that of large investor-owned utilities and private developers. In fact, our ability to establish our wind energy resources has been entirely dependent upon the REPI program. REPI is an appropriations-dependent awards program that is available to community-owned utilities through the Department of Energy. *After* bringing renewable generation on line, these systems can apply to DOE to receive a small annual payment. APPA estimates that we would need $27.5 million annually to fully fund the program—just to fund *existing* projects at levels comparable to the level of tax incentives for-profit companies receive automatically under section 45 of the tax code. However, the program has been consistently underfunded at $4 million or less. So, not only is REPI not adjusted for inflation, as its section 45 tax code counterpart is—it is funded at less than ⅕ the necessary level!

The REPI program is not keeping pace with the progress made by municipal utilities in bringing new renewable projects on line. And it is not fulfilling Congress' promise under the Energy Policy Act of promoting renewable energy resources

equally for all utility sectors and in all communities. With an annual operating budget of only $7.5 million and the price of wind turbines in the $2 million range, I can assure you that our company would not have embarked upon these projects without an incentive. And we have found that as we seek to add new turbines, we can not continue to rely on the iffy-at-best, woefully underfunded appropriations process.

If Congress wants to encourage more wind production, it should follow that Congress would like a variety of market entrants to make wind power prices as competitive as possible and ultimately, do away with the incentive. Right now, Congress has virtually limited the market to for-profit utilities and large developers. Public power systems and rural electric cooperatives are hamstrung at best and prevented at worst from bringing more renewable energy on line.

That is why I want to bring to your attention the need for a tax credit mechanism for renewable production that can be available to public power systems and rural electric cooperatives under Section 45 of the tax code.

It may be surprising to some to learn that public power leads the entire industry in renewable energy production as a percentage of our overall generating capacity. In fact, public power systems own almost twice the amount of non-hydro renewable capacity (as a percentage of total capacity) as investor-owned utilities. This is a demonstration of our commitment to being responsive to our customers' needs for clean energy and diverse portfolios of fuel choices that stabilize rates. Still, this amounts to *less than one percent* of our aggregate generating capacity. There is much more that can be developed, and tax credits for *all* sectors of the energy industry can help.

Conventional tax credits don't work for community owned utilities, who must meet a variety of state and local tax obligations but have no federal income tax liability to offset. We need a different mechanism, such as a tradable tax credit. A "tradable" tax credit would greatly help us to increase the amount of renewable energy we bring on line. Here's how it would work. Any taxpayer—including our customers—would be able to purchase a wind production tax credit from us at a discount from face value and apply full face value of the credit against their tax liability. We would in turn use the proceeds to offset the high costs of bringing more wind power on line. The credit could work on several levels. One, we could transfer the credit to our customers and consumers across the nation who would be encouraged by the credit to purchase more of our "Iowa Energy Tag" green power. This is a "win-win" for us, our customers, and many consumers across the country interested in offsetting carbon emissions by purchasing green generation. Two, we could sell the credit to third party developers and utilities and use the proceeds to invest in additional wind or other renewable generation. This is a "win-win" for both our utility and the recipient of the credit.

As a municipally-owned utility, we have an obligation to use any proceeds from a tradable credit for the direct benefit of our customers—meaning we will use the proceeds to bring more wind energy on line and at lower prices. Under both scenarios, the end result is more market participation in generating wind energy and lower costs of wind energy that achieve the ultimate goal of the tax incentive. As Congress considers tax incentives for renewable and clean energy resources that fulfill important public and environmental purposes, *I urge you to ensure that public power systems and rural electric cooperatives—which serve a full 25% of the nation's power consumers—also receive an incentive through a tradable credit program*. This would provide a reliable incentive that encourages public power systems and rural electric cooperatives to fully engage in bringing new renewable resources on line.

Thank you again for the opportunity to submit testimony. I would be happy to answer any questions you may have about our experience in wind energy and tradable tax credits for public power systems and rural electric cooperatives. More information is also available on our website at http://www.waverlyia.com/wlp/wind—energy.htm.

STATEMENT OF THE AMERICAN SOYBEAN ASSOCIATION

The American Soybean Association (ASA) appreciates the opportunity to present written testimony to the Senate Finance Committee regarding S. 1058, legislation introduced by Senators Tim Hutchinson (R–AR) and Mark Dayton (D–MN) that provides a partial exemption to the diesel fuel excise tax to diesel fuel suppliers who use blends of biodiesel. The amount of the exemption would be three cents for diesel fuel containing two percent biodiesel. The bill also proposes to provide 20 cents for diesel fuel containing twenty percent or higher blends of biodiesel.

This approach is similar to the partial tax exemption for ethanol, which provides a 5.4-cent exemption for gasoline that contains ten percent ethanol. Biodiesel and ethanol are complementary renewable fuels, since they are sold in separate fuel markets.

One of the first concerns with excise tax exemptions is the lost revenue to the Highway Trust Fund. The biodiesel industry is very sensitive to the needs of highway users, and supports the legislation's proposal to reimburse the Trust Fund with USDA's Commodity Credit Corporation (CCC). The cost to the CCC would be offset, at least initially, by savings realized in the cost of the soybean marketing loan program brought about by higher soybean prices from the increased use of soybean oil in biodiesel.

For example, if 100 million gallons of biodiesel were used under this program, it would be blended at two percent per gallon into five billion gallons of diesel fuel. At a cost of three cents per gallon, the cost of the incentive would be $150 million.

Soybean oil is a primary feedstock for biodiesel production. Assuming soy oil use in our example, reduced soybean oil surpluses will result in higher soybean prices, which will reduce CCC outlays under the soybean marketing loan program. If soybean prices increased 13 cents due to additional biodiesel demand, the savings for this year's estimated 2.75 billion bushel soybean crop would be $357 million. The Hutchinson/Dayton proposal will save more than two dollars for each dollar it costs.

The Congressional Budget Office (CBO) baseline released in December 2000 estimated that the CCC would incur the following costs (in billions) by fiscal year for the soybean marketing loan program:

FY02	FY03	FY04	FY05	FY06	FY07
$3.3	$3.3	$3.3	$3.0	$2.3	$0.9

It is clear from these figures that sufficient CCC funds would be available to reimburse the Highway Trust Fund. It also is clear that stimulating demand for biodiesel through a tax incentive and thereby reducing farm program costs by more than two dollars for every dollar invested through the tax incentive is good fiscal policy. Additionally, development of the biodiesel industry and the further use of biodiesel in fuel will help address our nation's current and future energy needs.

Mr. Chairman, the biodiesel industry believes that the timing is right for this proposal. For the last ten years U.S. soybean growers have invested in the research, development and commercialization of biodiesel. Biodiesel is a cleaner burning fuel produced from renewable resources such as soybean oil. It contains no petroleum but can easily be blended with petroleum. Biodiesel is typically blended at the 20% level with diesel or at the 2% or lower levels. It can be used in compression-ignition, diesel engines with little to no major modifications. Biodiesel in its neat or pure form is biodegradable and nontoxic, and is the first and only alternative fuel to meet EPA's Tier I and II health effects testing standards. Biodiesel has the highest BTU content of any alternative fuel, similar to Number 1 diesel.

Soybean growers began to invest in biodiesel because of the economics of the soybean industry. Soybeans are widely produced for the protein feed provided by in soybean meal. It is the plant protein of choice in the pork and poultry industries, leaving soybean oil as a valuable but abundant co-product. Because of large supplies of vegetable oils in the world market, we have a large surplus of soybean oil in the domestic market, which depresses the price of the whole soybean.

Several years ago, ASA recognized that the traditional approach of riding out a depressed market by storing surplus soybean oil until better times was not going to work. The industry had to do more. It needed to be proactive and aggressive in developing new markets. Through our state and national check off programs soybean growers began investing in the development of new uses of soybean oil. Several of the products are widely accepted in the marketplace, such as soy ink, and others are just reaching acceptance, such as biodiesel, solvents, lubricants and other fluids.

While biodiesel as a fuel is relatively new to our country, it is widely accepted and utilized in Europe, where motorists consume 250 million gallons annually. Our biodiesel industry leaders have worked closely with the European industry by sharing research, performance data and consumer information. The European biodiesel industry is strongly supported by government, environmentalists, and agribusiness.

While biodiesel offers environmental, energy security, and economic development benefits, it is not yet cost-competitive in the U.S. Public support is needed to help the industry develop. ASA strongly believes that our nation needs an aggressive energy policy that includes renewable fuels as well as significant domestic production

of oil and natural gas. Many times, public policy can be strategically employed to help catalyze a new industry that offers significant economic development opportunities. Biodiesel has this potential, and the public policy required to bring about this economic growth represents a savings to tax payers.

Although the Hutchinson/Dayton bill does not yet have an official score, we believe it is a cost-effective investment. As outlined earlier in the testimony, increasing biodiesel use reduces soybean oil surpluses. Reduced soybean oil surpluses will result in higher soybean prices, and raising soybean prices in the marketplace will reduce CCC outlays under the soybean marketing loan program. These noted benefits do not even consider the economic opportunities created from a new and expanding industry. Increased biodiesel demand will also result in new jobs, economic growth, and an increased income tax base created through increased economic activity.

Mr. Chairman, we appreciate the opportunity to share our views on this subject with the Committee. We look forward to additional discussions regarding this issue.

STATEMENT OF THE COALITION OF PUBLICLY TRADED PARTNERSHIPS

[SUBMITTED BY LETITIA CHAMBERS, PRESIDENT, COALITION OF PUBLICLY TRADED PARTNERSHIPS AND PRESIDENT, CHAMBERS ASSOCIATES INCORPORATED]

The Coalition of Publicly Traded Partnerships is pleased that the Committee has provided this opportunity to share its views on tax provisions that affect the production and supply of energy. The Coalition is a trade association representing publicly traded partnerships (PTPs) and those who work with them.

Summary

PTPs, also referred to as master limited partnerships or MLPs, are partnerships which are traded on public stock exchanges. They combine the benefits of a partnership investment with the affordability and liquidity of stocks and bonds, and are valued by investors for the income they provide through quarterly cash distributions and the potential for growth in both income and market value.

Publicly traded partnerships are highly relevant to the issues being examined by this Committee because in addition to the benefits they provide investors, PTPs benefit energy consumers by providing an efficient and effective means of channeling needed capital to companies that build, maintain, and operate our nation's energy infrastructure. About half of all PTPs are in the energy sector, but their importance far exceeds their numbers, for these PTPs represent two-thirds of PTPs' market capital and close to three-quarters of assets owned by PTPs. However, they are prevented from fully realizing their capital formation potential by a provision—or more specifically, an omission—in the tax code.

Although PTPs, as a liquid security providing a steady income stream, should be an excellent investment for mutual funds, they are not able to access capital from this source because they are not on the tax code's list of qualifying income sources for mutual funds. The reason they are not on the list is that PTPs did not exist at the time that the mutual fund provisions, including the qualifying income list, were placed in the Code. This means that a mutual fund whose gross income from PTPs and other "nonqualifying" sources exceeds 10% of its total gross income will lose its regulated investment company status under the tax code. Faced with this Draconian possibility and the burden of tracking income percentage, mutual fund managers turn away from PTPs. With only the retail market available to them, PTPs find that raising capital for building energy infrastructure is far more difficult and costly than it should be.

The Publicly Traded Partnership Equity Act (S. 1141, H.R. 1463), sponsored by Senators Gramm, Grassley, Murkowski, Nickles, and Hutchison, and in the House by Rep. Wally Herger and a bipartisan group of cosponsors,[1] would rectify this omission by adding income derived from PTPs to the qualifying income list for mutual funds. This change in the tax law would:

- Increase the flow of capital into the energy industry and fund investments in energy infrastructure which supports the U.S. economy as a whole.
- Help lower energy prices for consumers by reducing the cost of capital to energy companies.

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[1] Reps. Crane, Houghton, Ramstad, Foley, English, Matsui, Neal, and McKeon are original cosponsors; Reps. Hayworth and Cooksey have also signed on.

- Benefit current PTP unitholders through the increase in value of their units resulting from increased activity in PTP units and greater interest in PTPs by Wall Street analysts and bankers.
- Provide an opportunity for the millions of individuals who invest in mutual funds to participate in an investment that offers very attractive returns.
- Eliminate the artificial constraints of the tax code and place decisions on mutual fund investment in PTPs where they belong—with mutual fund managers

For these reasons, we believe that the provisions of S. 1141 should be part of any energy-related tax provisions considered by the Finance Committee.

Background

It is appropriate to consider PTPs in the context of an energy bill, because they began as a way for the energy industry to raise additional capital. The energy industry, like the real estate industry, had always used partnerships as a means of raising equity capital, because partnerships allowed investors more direct participation than the corporate form, not only in the earnings of the business but also in the considerable benefits that the tax code confers on these industries.

The nature of partnership investment in the time before PTPs, however, meant that this form of equity could be raised only from investors in the upper-income tiers, often those seeking a tax shelter. To become a limited partner, it was necessary to invest a very large amount of money—$10,000 to $20,000 at a minimum. Once an investor was in a partnership, it was very hard to get out before the partnership was liquidated, which typically did not occur for a number of years. Many partnership deals did not receive the tough SEC scrutiny what protects investors in publicly traded securities. Thus, limited partnerships appealed only to investors with considerable disposable income and either a high tolerance for risk or a desire to minimize tax liability.

The PTP was the vehicle for addressing these disadvantages of partnerships. Partnership interests were divided into units which were sold at affordable prices and traded on public stock exchanges, providing liquidity for investors who were wary of the long-term required by nontraded partnerships. With public trading of units came the full panoply of regulation that the SEC requires for publicly traded entities—securities registration, proxy statements, 10–K reports, and the like. This allowed energy companies to market partnerships for the first time to middle class investors who were seeking not a tax shelter but an investment that would provide them with a steady cash flow and potential for growth.

The first PTP, an oil company formed in 1981, was Apache Oil Company. Apache was followed by a number of others, as both energy and real estate companies discovered the advantages of this new means of capital formation. PTPs were formed in a number of other industries as well.

In 1987, Congress enacted section 7704 of the tax code, which defined PTPs eligible for partnership tax treatment as those earning their income from natural resource activities, interest, dividends, real estate rents and capital gains, and commodities income. While the growth of new PTPs in other areas has diminished since 1987, PTPs continue to be an important feature of the energy industry, with each year bringing both new partnerships and new equity issues by existing partnerships.

Publicly Traded Partnerships Today

There are currently about fifty PTPs trading on the New York American, and NASDAQ exchanges, with another in registration. Based on this year 2000 10–Ks, the total market capital of all PTPs is about $19 billion, total assets about $32 billion, and total annual revenue about $39 billion.

About half of these PTPs are in the energy business. For the most part, these are not the old oil and gas partnerships of the eighties, but partnerships which are actively engaged in building and operating the infrastructure that gathers oil and natural gas from underground and offshore sites, processes it into liquified natural gas and petroleum products, stores crude oil, natural gas, and refined products in bulk terminals, and transports them via pipeline and truck to communities throughout the United States. A number of PTPs also deliver propane to industrial and rural customers throughout the United States. In addition, one PTP is involved in coal mining and marketing.

Operating through PTPs works well for these companies because of the good fit between the nature of their businesses and the nature of partnerships. In a partnership, it is particularly important that investors receive regular and substantial cash distributions because of the fact that it is the partners who pay income tax on the partnership earnings. An investment that requires an investor to pay tax on income he doesn't receive (his allocated share of partnership income) will not do well in the

market unless it pays out cash to the investor that comfortably exceeds that tax; therefore, a partnership must own assets that generate a reliable income stream. The energy companies that operate through PTPs meet this test by using the capital raised by issuing equity units to acquire or build assets such as pipelines that will then generate income for several years without much additional investment.

While they constitute about half of the number of PTPs on the market, the energy PTPs overwhelmingly dominate the PTP universe by just about every other measure. They represent about two-thirds of PTP market capital, close to three-fourths of the assets held by PTPs, and nine-tenths of the total income earned by PTPs.

Table 1.
Summary of PTP Financial Information Reported on FY 2000 10-Ks
($millions, except numbers of PTPs)

	Number of PTPs	Total Market Value	% of all PTPs	Total Assets	% of all PTPs	Total Income	% of all PTPs
Natural Resources							
Energy Production, Refining, Transport, etc.	23	$ 11,929.8	64.2%	$22,579.8	71.0%	$35,116.9	89.7%
Minerals and Timber	5	$ 349.3	1.9%	$1,850.1	5.8%	$ 1,563.4	4.0%
All Natural Resources	**28**	**$ 12,279.1**	**66.1%**	**$24,429.9**	**76.8%**	**$ 36,680.4**	**93.7%**
Real Estate							
Income Properties and Homebuilders	8	$ 1,278.5	6.9%	$3,113.0	9.8%	$1,010.6	2.6%
Mortgage Securities	7	$ 727.8	3.9%	$1,528.6	4.8%	$160.6	0.4%
All Real Estate	**15**	**$ 2,006.2**	**10.8%**	**$4,641.6**	**14.6%**	**$1,171.1**	**3.0%**
Miscellaneous	**8**	**$ 4,300.1**	**23.1%**	**$2,741.1**	**8.6%**	**$1,306.7**	**3.3%**
All PTPs	**51**	**$ 18,585.5**	**100.0%**	**$ 31,812.6**	**100.0%**	**$39,158.2**	**100.0 %**

Numbers may not add to totals due to rounding.

The information in this table was drawn from the Coalition's compilation of 10–K filings for 2000. It does not capture a snapshot of PTP market capital at a fixed point in time, both because 10–Ks usually report market capitalization at the time the report is filed rather than as of the end of the fiscal year, and because some PTPs have fiscal years other than the calendar year and thus filed some months earlier than the others.

However, A.G. Edwards & Co., an active underwriter of energy PTP offerings and the source of several analyses of PTPs operating in the midstream and pipeline energy sectors, recently compiled such a snapshot. They found that **as of May 29, 2001, the total combined market capitalization of PTPs is $27.1 billion.** The increase relative to the figures in the table is largely due to several offerings that occurred early in 2001, two of which were IPOs and the rest equity offerings by existing PTPs, all in the energy field. Other A.G. Edwards findings include:

- The top 10 PTPs, all in the energy field, currently represent 68% of total market capitalization in PTPs.
- The 12 midstream energy/pipeline PTPs listed on the New York Stock Exchange:
- Have enterprise values (market equity plus debt) ranging from $6 billion to $461 million and a combined enterprise value of $22.5 billion.
- Have combined revenue of over $20 billion.
- Have a current yield ranging from 5.5% to 10.3%, and an average yield of 7.2%.
- For the ten that were trading last year (two are 2001 IPOs), the annual *growth* in distributions ranged from 1.4% to 16.4%, with an average of 5.4%.

The Coalition compilation shows that the annual distributions for these PTPs during calendar year 2000 ranged from $1.84 to $3.50 per unit, with an average of $2.48 (the average for all energy PTPs was $2.00, and for all PTPs was $1.66). For more detail, see Exhibit 1 following this testimony.

These energy partnerships have a substantial presence in energy producing states. In Texas, for example, energy PTPs own $3.6 billion in assets or property, plant, and equipment located in the state; employ 2.787 residents, and have an annual in-state payroll of $178 million—again not counting the three propane PTPs, as well as one natural gas producer and one crude oil gatherer. Texas residents own units in these PTPs valued at $6.9 billion.

Similarly, in Louisiana energy PTPs own $1.6 billion in assets or property, plant, and equipment located in the state; employ 1,474 residents; and have an annual in-state payroll of $88 million—and this does not count the three propane PTPs with operations in that state. Louisiana residents own 3.9 million units in these PTPs, valued at $160 million.

The Issue: Lack of Mutual Fund Ownership

At this point you may be asking yourself where the catch is in this rosy picture. The catch is this: these PTPs could be raising substantially more capital, acquiring more assets, building more energy infrastructure, transporting more energy products to the places where they are so urgently needed, than they are at this time. The reason that they have not done so is that they are currently operating with one hand tied behind their backs: they are raising capital with virtually no access to institutional investors. The reason for this can be found in the tax code. One reason is the unrelated business income tax (UBIT) rules applying to tax-exempt investors such as pension funds. The second, and the one we are asking you to address at this time, is the regulated investment company (RIC) rules, which govern mutual funds.

PTPs don't have access to mutual funds because they didn't exist when the mutual fund rules were written. Mutual funds were created to provide individuals with a convenient affordable means of owning a varied portfolio of securities that they would otherwise buy themselves on the market. Thus, the income that a mutual fund could earn and pass through to its investors was limited to that derived fro the securities on the market at the time: interest, dividends, payments with respect to securities loans, gains from the sale of securities and foreign currency, etc.

The rule that was written into the Code was that this sort of income must constitute 90% of the mutual fund's gross income in order for the mutual fund to qualify as a RIC with passthrough tax status. Partnership income—be it the partnership income allocated to the investor on which the investor pays tax or the cash distribution paid to the partner—is nowhere on the list because, as discussed in the previous section, traditional nontraded partnerships were not the sort of sale, liquid, common securities investment for which mutual funds were created.

PTPs, however, are exactly that sort of investment. Liquid, affordable, and completely SEC regulated, providing a steady stream of income for distribution to mutual fund investors, they are as worthy of qualification under the RIC rules as any other public security.

In other words, PTPs are living under an archaic rule that was written before they existed with a completely different type of partnership in mind. It is long past time for this section of the tax code to be brought into the 21st century.

What is the effect of this rule on PTPs? Quite simply, mutual funds rarely buy their units. If gross income from the PTP, along with any other "nonqualifying" sources exceeds 10% of the fund's total, the mutual fund will lose its RIC status. This is not a risk that most mutual fund managers want to take. Moreover, they do not want to assume the burden of tracking income percentages to make sure they do not go over the line when they can avoid the whole problem by sticking to stocks and bonds.

As a result, only about 10% of PTP common units examined by A.G. Edwards were owned by institutional investors (exempt organizations and mutual funds), while 55% of the common shares of midstream energy corporations were held by institutions. And this is in a market where mutual funds now account for an estimated 80% share of all equity offerings, where 20% of all market equity is held by mutual funds, and mutual funds have almost $7 trillion in assets under management.

In practical terms, this means that when existing PTPs want to issue equity, or energy businesses want to create new PTPs, in order to finance their plans for acquisition of new assets, broadening their infrastructure, and more efficiently meeting the country's energy needs, they can do so only to the extent that individual investors are willing and able to buy them. As a result, PTP managers wishing to raise a certain amount of capital must do it in several smaller offerings instead of one large one, increasing the cost of capital, or must assume more debt than they would prefer. They must even check to be sure that none of the other PTPs are planning an offering that is near in time to theirs, because the retail market can

only absorb so many PTP units at a time. Needless to say, this hampers, delays, and increases the cost of every major project or acquisition that these companies wish to undertake.

Conclusion

There is no reason for PTP managers to be limited in this way when there is such a need for the energy infrastructure that they could be financing. The Publicly Traded Partnership Equity Act (S. 1141, H.R. 1463) would put an end to this restrictive situation and modernize this bit of the tax code by simply adding income derived from PTPs to the qualifying income list in the RIC rules. The provisions of S. 1141 have been approved by Congress already, as part of the Taxpayer Refund and Relief Act of 1999, which was vetoed by President Clinton.

Enactment of the Publicly Traded Partnership Equity Act would:

- Increase the flow of capital into the energy industry and fund investments in energy infrastructure which supports the U.S. economy as a whole.
- Help lower energy prices for consumer by reducing the cost of capital to energy companies.
- Benefit current PTP unitholders through the increase in value of their units resulting from increased activity in PTP units and greater interest in PTPs by Wall Street analysts and bankers.
- Provide an opportunity for the millions of individuals who invest in mutual funds to participate in an investment that offers very attractive returns.
- Eliminate the artificial constraints of the tax code and place decisions on mutual fund investment in PTPs where they belong—with mutual fund managers.

If this Committee decides that this is an appropriate time to enact tax measures to help address the energy situation, we urge that this provision be included. It is simple, it is noncontroversial, it is low-cost (the Joint Tax Committee estimated its cost as only $170 million over ten years in the 1999 bill), and it does not require any government intervention in the energy industry or the capital markets. It simply gives PTPs the freedom to do more of what they have been doing so well all along—raising capital to build the infrastructure to process, store, and transport the energy products that are critically need to meet our nation's energy requirements.

Table 2.
Features of 12 Midstream Energy / Pipeline Publicly Traded Partnerships
as of May 29, 2001

	Enterprise Value	2000 Revenue	Current Yield	Annual Distribution Growth	2000 Distributions
Buckeye Partners, L.P.	$ 1,323.0	299.0	6.4%	5.8%	$ 2.40
El Paso Energy Partners, L.P.	$ 1,631.0	112.2	6.6%	1.7%	$ 2.15
Enterprise Products Partners, L.P.	$ 3,672.0	3,049.0	5.5%	9.3%	$ 2.05
EOTT Energy Partners	$ 754.0	8,340.0	10.3%	1.7%	$ 1.90
Kaneb Pipe Line Partners	$ 856.0	156.3	7.4%	3.1%	$ 2.80
Kinder Morgan Energy Partners, L.P.	$ 6,036.0	816.6	5.9%	16.4%	$ 3.43
Lakehead Pipeline Partners	$ 2,095.0	305.6	7.7%	4.6%	$ 3.50
Northern Border Partners, L.P.	$ 2,455.0	339.7	7.6%	3.5%	$ 2.70
Plains All American Pipeline, L.P.	$ 1,186.0	4,102.0	7.3%	1.4%	$ 1.84
Shamrock Logistics, L..P.	$ 631.0	92.0	7.9%	N/A	N/A
TEPPCO , L.P.	$ 1,417.0	3,087.9	7.2%	6.2%	$ 2.00
Williams Energy Partners, L.P.	$ 461.0	71.5	6.6%	N/A	N/A
Total (Value & Revenue) / Average	$ 22,517.0	$20,771.9	7.2%	5.4%	$ 2.48

Sources: A.G. Edwards & Co., Coalition of Publicly Traded Partnerships

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Sources: A.G. Edwards & Co., Coalition of Publicly Traded Partnerships

PUBLICLY TRADED PARTNERSHIPS OPERATING IN FINANCE COMMITTEE MEMBERS' STATES
*** = Headquartered in State** ***Italics*** **= Non-energy PTP**

ALASKA

Cornerstone Propane Partners, L.P.
Heritage Propane Partners, L.P.

ARIZONA

Amerigas Partners, L.P.
Cornerstone Propane Partners, L.P.
Crown Pacific Partners, L.P.
Ferrellgas Partners, L.P.
Heritage Propane Partners, L.P.
Kaneb Pipe Line Partners, L.P.
Kinder Morgan Energy Partners, L.P.

ARKANSAS

Cornerstone Propane Partners, L.P.
EOTT Energy Partners, L.P.
TEPPCO, L.P.
Terra Nitrogen, L.P.

FLORIDA

Buckeye Partners, L.P.
Cornerstone Propane Partners, L.P.
EOTT Energy Partners, L.P.
Genesis Energy, L.P.
Heritage Propane Partners, L.P.
Kaneb Pipe Line Partners, L.P.
Royal Palm Beach Colony, L.P.
Williams Energy Partners, L.P.

IOWA

Kaneb Pipe Line Partners, L.P.
Kinder Morgan Energy Partners, L.P.
Northern Border Partners, L.P.
TC Pipeline Partners, L.P.
Terra Nitrogen, L.P. *
Williams Energy Partners, L.P.

LOUISIANA

Amerigas Partners, L.P.
El Paso Energy Partners
Enterprise Products Partners
EOTT Energy Partners
Ferrellgas Partners, L.P.
FFP Partners, L.P.
Genesis Energy, L.P.
Kaneb Pipe Line Partners
Kinder Morgan Energy Partners
Plains All American Pipeline
Suburban Propane Partners, L.P.
TEPPCO Partners, L.P.

MAINE

Star Gas Partners, L.P.

MASSACHUSETTS

Boston Celtics, L.P.
Buckeye Partners, L.P.
Cornerstone Propane Partners, L.P.
Heritage Propane Partners, L.P.
New England Realty Associates, L.P.
Star Gas Partners

MISSISSIPPI

Cornerstone Propane Partners, L.P.
El Paso Energy Partners, L.P.
Enterprise Products Partners, L.P.
EOTT Energy Partners, L.P.
FFP Partners, LP.
Genesis Energy, L.P.
Plains All American Pipeline, L.P.
Suburban Propane, L.P.
Williams Energy Partners, L.P.

MONTANA

Crown Pacific Partners, L.P.
EOTT Energy Partners, L.P.
Heritage Propane Partners, L.P.
Northern Border Partners, L.P.
TC Pipeline Partners, L.P.

NEW JERSEY

Buckeye Partners, L.P.
Cornerstone Propane Partners, L.P.
Heritage Propane Partners, L.P.
Star Gas Partners, L.P.
Suburban Propane, L.P.*

NEW MEXICO

Cornerstone Propane Partners, L.P.
EOTT Energy Partners, L.P.
FFP Partners, L.P.
Genesis Energy, L.P.
Heritage Propane Partners, L.P.
Kaneb Pipe Line Partners
Kinder Morgan Energy Partners, L.P.
Shamrock Logistics, L.P.

NORTH DAKOTA

EOTT Energy Partners, L.P.
Kaneb Piple Line Partners, L.P.
Northern Border Partners, L.P.
TC Pipeline Partners, L.P.

OKLAHOMA

Alliance Resource Partners, L.P.*
Cornerstone Propane Partners, L.P.
Dorchester Hugoton, Ltd.
EOTT Energy Partners
FFP Partners, L.P.
Genesis Energy, L.P.
Heritage Propane Partners, L.P.*
Kaneb Pipe Line Partners, L.P.
Kinder Morgan Energy Partners
Plains All American Pipeline, L.P.
Shamrock Logistics, L.P.
Terra Nitrogen, L.P.
Williams Energy Partners, L.P.*

SOUTH DAKOTA

Ferrellgas Partners, L.P.
Kaneb Piple Line Partners, L.P.
Northern Border Partners, L.P.
TC Pipeline Partners, L.P.

TENNESSEE

Cornerstone Propane Partners, L.P.
FFP Partners, L.P.
Heritage Propane Partners, L.P.
Northern Border Partners, L.P.
Williams Energy Partners, L.P.

TEXAS

Amerigas Partners, L.P.
Buckeye Partners, L.P.
Dorchester Hugoton, Ltd.*
El Paso Energy Partners, L.P.*
Enterprise Products Partners, L.P.*
EOTT Energy Partners, L.P.*
Ferrellgas Partners, L.P.
FFP Partners, L.P.
Genesis Energy, L.P.*
Hallwood Realty Partners
Heritage Propane Partners, L.P.
Kaneb Pipe Line Partners, L.P.*
Kinder Morgan Energy Partners*
Plains All American Pipeline, L.P*.
Pride Companies, L.P.*
Shamrock Logistics, L.P.*
Suburban Propane Partners, L.P.
TEPPCO Partners, L.P.*
Williams Energy Partners, L.P.

UTAH

Amerigas Partners, L.P.
Cornerstone Propane Partners, L.P.
EOTT Energy Partners, L.P.
Ferrellgas Partners, L.P.

VERMONT

Cornerstone Propane Partners, L.P.
Heritage Propane Partners, L.P.

WEST VIRGINIA

Alliance Resource Partners, L.P.
Cornerstone Propane Partners, L.P
Star Gas Partners, L.P.

STATEMENT OF THE DEPARTMENT OF TREASURY, OFFICE OF TAX POLICY

Mr Chairman, Mr. Grassley, and Members of the Committee:

This statement is submitted for inclusion in the record of the hearings before the Committee on July 10 and 11, 2001, and a third date to be scheduled. The subject of the hearings and this statement is the role of tax incentives in energy policy.

It is the goal of this Administration to pursue an energy policy that protects America's economic, security, and environmental interests. As you know, in May the President's National Energy Policy Development (NEPD) Group released its report

entitled "Reliable, Affordable, and Environmentally Sound Energy for America's Future." The report sets forth three basic features of a National Energy Policy:

The Policy is a long-term, comprehensive strategy. Our energy crisis has been years in the making, and will take years to put fully behind us.

The Policy will advance new, environmentally friendly technologies to increase energy supplies and encourage cleaner, more efficient energy use.

The Policy seeks to raise the living standards of the American people, recognizing that to do so our country must fully integrate its energy, environmental, and economic policies.

In that context, the Office of Tax Policy appreciates the opportunity to present testimony on tax incentives to promote energy conservation and increase domestic production of oil and gas.

ENERGY EFFICIENCY AND ALTERNATIVE ENERGY SOURCES

Incentives for energy efficiency and alternative energy sources are essential elements of national energy policy. The continuing strength of our economy over the past two years, despite oil price rises, underscores the dramatic improvements in energy efficiency we have achieved over the past quarter century, as well as the changing economy. While past oil shortages have taken a significant toll on the U.S. economy, the recent increases in oil prices have not affected the economy much. Increased energy efficiency in cars, homes, and manufacturing has helped insulate the economy from these short-term market fluctuations. In 1974, we consumed 15 barrels of oil for every $10,000 of gross domestic product. Today we consume only 8 barrels of oil for the same amount (in constant dollars) of economic output.

CURRENT LAW TAX INCENTIVES FOR ENERGY EFFICIENCY AND ALTERNATIVE FUELS

Tax incentives currently provide an important element of support for energy-efficiency improvements and increased use of renewable and alternative fuels. Current incentives are estimated to total $1.2 billion for fiscal years 2002 through 2006. They include a tax credit for electric vehicles and expensing for clean-fuel vehicles ($20 million), a tax credit for the production of electricity from wind or biomass and a tax credit for certain solar energy property ($590 million), and an exclusion from gross income for certain energy conservation subsidies provided by public utilities to their customers ($580 million).[1]

Electric and clean-fuel vehicles and clean-fuel vehicle refueling property

A 10-percent tax credit is provided for the cost of a qualified electric vehicle, up to a maximum credit of $4,000. A qualified electric vehicle is a motor vehicle that is powered primarily by an electric motor drawing current from rechargeable batteries, fuel cells, or other portable sources of electric current, the original use of which commences with the taxpayer, and that is acquired for use by the taxpayer and not for resale. The full amount of the credit is available for purchases prior to 2002. The credit begins to phase down in 2002 and does not apply to vehicles placed in service after 2004.

Certain costs of qualified clean-fuel vehicles and clean-fuel vehicle refueling property may be deducted when such property is placed in service. Qualified electric vehicles do not qualify for the clean-fuel vehicle deduction. The deduction begins to phase down in 2002 and does not apply to property placed in service after 2004.

Energy from wind or biomass

A 1.5-cent-per-kilowatt-hour tax credit is provided for electricity produced from wind, "closed-loop" biomass (organic material from a plant that is planted exclusively for purposes of being used at a qualified facility to produce electricity), and poultry waste. The electricity must be sold to an unrelated person and the credit is limited to the first 10 years of production. The credit applies only to facilities placed in service before January 1, 2002. The credit amount is indexed for inflation after 1992.

Solar energy

A 10-percent investment tax credit is provided to businesses for qualifying equipment that uses solar energy to generate electricity, to heat or cool or provide hot water for use in a structure, or to provide solar process heat.

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[1] *Analytical Perspectives, Budget of the United States Government, Fiscal Year 2002*, U.S. Government Printing Office, Washington, DC, 2001, p. 63.

Ethanol and renewable source methanol

An income tax credit and an excise tax exemption are provided for ethanol and renewable source methanol used as a fuel. In general, the income tax credit is 53 cents per gallon for ethanol and 60 cents per gallon for renewable source methanol. As an alternative to the income tax credit, gasohol blenders may claim an equivalent gasoline tax exemption for each ethanol and renewable source methanol that is blended into qualifying gasohol.

The income tax credit expires on December 31, 2007, and the excise tax exemption expires on September 30, 2007. In addition, the ethanol credit and exemption are each reduced by 1 cent per gallon in 2003 and by an additional 1 cent per gallon in 2005. Neither the credit nor the exemption applies during any period in which motor fuel taxes dedicated to the Highway Trust Fund are limited to 4.3 cents per gallon. Under current law, the motor fuel tax dedicated to the Highway Trust Fund will be limited to 4.3 cents per gallon beginning on October 1, 2005.

Energy conservation subsidies

Subsidies provided by public utilities to their customers for the purchase or installation of energy conservation measures are excluded from the customers' gross income. An energy conservation measure is any installation or modification primarily designed to reduce consumption of electricity or natural gas or to improve the management of energy demand with respect to a dwelling unit.

ADMINISTRATION BUDGET PROPOSALS

The Administration's budget proposals for fiscal year 2002 include tax incentives for renewable energy resources. The budget also proposes to modify the tax treatment of nuclear decommissioning funds. The Administration's budget proposals are described below.[2]

Electricity from wind and biomass

The President's Budget proposes to extend the credit for electricity produced from wind and biomass for three years to facilities placed in service before January 1, 2005. In addition, eligible biomass sources would be expanded to include certain biomass from forest-related resources, agricultural sources, and other specified sources. Special rules would apply to biomass facilities placed in service before January 1, 2002. Electricity produced at such facilities from newly eligible sources would be eligible for the credit only from January 1, 2002, through December 31, 2004. The credit for such electricity would be computed at a rate equal to 60 percent of the generally applicable rate. Electricity produced from newly eligible biomass co-fired in coal plants would also be eligible for the credit only from January 1, 2002, through December 31, 2004. The credit for such electricity would be computed at a rate equal to 30 percent of the generally applicable rate.

Residential solar energy systems

The President's Budget proposes a new tax credit for individuals that purchase solar energy equipment used to generate electricity (photovoltaic equipment) or heat water (solar water heating equipment) for use in a dwelling unit that the individual uses as a residence. The credit would be available only for equipment used exclusively for purposes other than heating swimming pools. The proposed credit would be equal to 15 percent of the cost of the equipment and its installation. The credit would be nonrefundable and an individual would be allowed a lifetime maximum credit of $2,000 per residence for photovoltaic equipment and $2,000 per residence for solar water heating equipment. The credit would apply only to solar water heating equipment placed in service after December 31, 2001, and before January 1, 2006, and to photovoltaic systems placed in service after December 31, 2001, and before January 1, 2008.

Nuclear decommissioning funds

The President's Budget proposes to repeal the current law provision that limits deductible contributions to a nuclear decommissioning fund to the amount included in the taxpayer's cost of service for ratemaking purposes. Thus, unregulated taxpayers would be allowed a deduction for amounts contributed to a qualified nuclear decommissioning fund. The Administration also proposes to permit funding of all decommissioning costs (including pre-1984 costs) through qualified nuclear decommissioning funds. Contributions to fund pre-1984 costs would be deductible except to the extent a deduction (other than under the qualified fund rules) or an exclusion

[2] For a more detailed description, see *General Explanations of the Administration's Fiscal Year 2002 Tax Relief Proposals*, Department of the Treasury, April 2001.

from income has been previously allowed with respect to those costs. The Administration's proposal would clarify that any transfer of a qualified nuclear decommissioning fund in connection with the transfer of the power plant with which it is associated would be nontaxable and no gain or loss will be recognized by the transferor or transferee as a result of the transfer. In addition, the proposal would permit taxpayers to make deductible contributions to a qualified fund after the end of the nuclear power plant's estimated useful life and would provide that nuclear decommissioning costs are deductible when paid.

NEPD GROUP PROPOSALS

The Report of the NEPD Group also included tax incentives for renewable energy resources and for more efficient energy use. The NEPD Group proposals are described below.[3]

Fuel from landfill methane

The NEPD Group report proposes to extend the section 29 credit for fuel produced from landfill methane produced at a facility (or portion of a facility) that is placed in service after December 31, 2001. Fuel produced at such facilities would be eligible for the credit through December 31, 2010. The proposal would also expand the credit by permitting the credit for fuel used by the taxpayer to produce electricity. The credit for fuel produced at landfills subject to EPA's 1996 New Source Performance Standards/Emissions Guidelines would be limited to two-thirds of the otherwise applicable amount. In the case of landfills with facilities that currently qualify for the section 29 credit, this limitation would not apply until after 2007.

Ethanol and renewable source methanol

The NEPD Group report proposes to extend the income tax credit and excise tax exemption for ethanol and renewable source methanol through December 31, 2010. The current law rule providing that neither the credit nor the exemption applies during any period in which motor fuel taxes dedicated to the Highway Trust Fund are limited to 4.3 cents per gallon would be retained. As under current law, the credit and the exemption would each be reduced by 1 cent per gallon in 2003 and by an additional 1 cent per gallon in 2005.

Hybrid and fuel cell vehicles

The NEPD Group report proposes to provide temporary tax credits for certain hybrid and fuel cell vehicles.

A credit of $250 to $4,000 would be available for purchases of qualifying hybrid vehicles after December 31, 2001, and before January 1, 2008. A hybrid vehicle is a vehicle that draws propulsion from both an on-board internal combustion or heat engine using combustible fuel and an on-board rechargeable energy storage system. To qualify for the minimum credit, a hybrid vehicle would be required to derive at least 5 percent of its maximum available power from the rechargeable energy storage system. Larger credits would be available for vehicles that derive larger percentages of power from the rechargeable energy storage system and for vehicles that meet specified fuel economy standards.

A credit of $1,000 to $8,000 would be available for the purchase of qualifying fuel cell vehicles after December 31, 2001, and before January 1, 2008. A fuel cell vehicle is a motor vehicle propelled by power derived from one or more cells that convert chemical energy directly into electricity by combining oxygen with on-board hydrogen (including hydrogen produced from on-board fuel that requires reformation before use). To qualify for the minimum credit, a fuel cell vehicle would be required to meet a minimum fuel economy standard for its weight class. Larger credits would be available for vehicles that achieve higher fuel economy standards.

Combined heat and power systems

To encourage more efficient energy usage, the NEPD Group report proposes to provide a 10-percent investment credit for qualifying combined heat and power (CHP) systems. CHP systems are used to produce electricity (and/or mechanical power) and usable heat from the same primary energy source. To qualify for the credit, a system would be required to produce at least 20 percent of its total useful energy in the form of thermal energy and at least 20 percent in the form of electrical and/or mechanical power and would also be required to satisfy an energy efficiency standard. The credit would apply to CHP equipment placed in service after December 31, 2001, and before January 1, 2007.

[3] For a more detailed description, see the attachments to this statement.

INCREASING DOMESTIC OIL AND GAS PRODUCTION

Before turning to a discussion of the present tax treatment of oil and gas activities, we would like to provide a brief overview of this sector.

Overview

Oil is an internationally traded commodity with its domestic price set by world supply and demand. Domestic exploration and production activity is affected by the world price of crude oil. Historically, world oil prices have fluctuated substantially. From 1970 to the early 1980s, there was a fivefold increase in real oil prices. World oil prices fell sharply in 1986 and were relatively more stable from 1986 through 1997. During that period, average refiner acquisition costs ranged from $16.24 to $25.63 per barrel in real 1996 dollars.[4] In 1998, however, oil costs to the refiner declined to $12.52 per barrel in nominal dollars ($12.13 per barrel in 1996 dollars), their lowest level in 25 years in real terms. Since 1998, the decline has reversed with refiner acquisition costs (in nominal dollars) rising to $17.51 per barrel in 1999 and $28.23 per barrel in 2000 (the price has since dropped to $24.97 per barrel in May 2001, the latest month for which composite figures are available). The equivalent prices in 1996 dollars are $16.71 per barrel in 1999, $26.40 per barrel in 2000, and $23.01 per barrel in May 2001.

Domestic oil production has been on the decline since the mid-1980s. From 1978 to 1983 oil consumption in the United States also declined, but increasing consumption since 1983 has more than offset this decline. In 2000, domestic oil consumption was 28 percent higher than in 1970. The decline in oil production and increase in consumption have led to an increase in oil imports. Net petroleum (crude and product) imports have risen from approximately 38 percent of consumption in 1988 to 52 percent in 2000.

A similar pattern of large recent price increases and increasing dependence on imports has occurred in the natural gas market. During the second half of the 1990s, spot prices for natural gas exceeded $4.00 per million Btu (MMBtu) in only one month (February 1996). The spot price again exceeded $4.00 per MMBtu in May 2000, rose above $5.00 per MMBtu in September 2000, and exceeded $10.00 per MMBtu for several days last winter. Since last winter the price has fallen sharply. The current spot price is approximately $3.00 per MMBtu.[5]

The United States has large natural gas reserves and was essentially self-sufficient in natural gas until the late 1980s. Since 1986, natural gas consumption has increased by more than 30 percent but natural gas production has increased by only 17 percent. Net imports as a share of consumption nearly quadrupled from 1986 to 2000, rising from 4.2 percent to 15.6 percent. Natural gas from Canada makes up nearly all of the imports into the United States.

Current law tax incentives for oil and gas production

Although the Administration's energy plan contains no new tax incentives for oil and gas production, the Internal Revenue Code includes a variety of measures to stimulate domestic exploration and production. They are generally justified on the ground that they reduce vulnerability to an oil supply disruption through increases in domestic production, reserves, exploration activity, and production capacity. The tax incentives contained in present law address the drop in domestic exploratory drilling that has occurred since the mid-1950s and the continuing loss of production from mature fields and marginal properties.

Incentives for oil and gas production are estimated to total $9.8 billion for fiscal years 2002 through 2006.[6] They include the nonconventional fuels (i.e., oil produced from shale and tar sands, gas produced from geopressured brine, Devonian shale, coal seams, tight formations, or biomass, and synthetic fuel produced from coal) production credit ($2.4 billion), the enhanced oil recovery credit ($4.4 billion), the allowance of percentage depletion for independent producers and royalty owners, including increased percentage depletion for stripper wells ($2.3 billion), the exception from the passive loss limitation for working interests in oil and gas properties ($100 million), and the expensing of intangible drilling and development costs ($640 million). In addition to those tax expenditures, oil and gas activities have largely been eliminated from the alternative minimum tax. These provisions are described in detail below.

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[4] Nominal prices are converted to 1996 dollars using the Bureau of Economic Analysis Implicit Price Deflator.

[5] All price references are to the spot price at the Henry Hub and are in nominal dollars.

[6] *Analytical Perspectives, Budget of the United States Government, Fiscal Year 2002*, U.S. Government Printing Office, Washington, DC, 2001, p. 63.

Percentage depletion

Certain costs incurred prior to drilling an oil- or gas-producing property are recovered through the depletion deduction. These include costs of acquiring the lease or other interest in the property, and geological and geophysical costs (in advance of actual drilling). Any taxpayer having an economic interest in a producing property may use the cost depletion method. Under this method, the basis recovery for a taxable year is proportional to the exhaustion of the property during the year. The cost depletion method does not permit cost recovery deductions that exceed the taxpayer's basis in the property or that are allowable on an accelerated basis. Thus, the deduction for cost depletion is not generally viewed as a tax incentive.

Independent producers and royalty owners (as contrasted to integrated oil companies)[7] may qualify for percentage depletion. A qualifying taxpayer determines the depletion deduction for each oil or gas property under both the percentage depletion method and the cost depletion method and deducts the larger of the two amounts. Under the percentage depletion method, generally 15 percent of the taxpayer's gross income from an oil- or gas-producing property is allowed as a deduction in each taxable year. The amount deducted may not exceed 100 percent of the net income from that property in any year (the "net-income limitation").[8] Additionally, the percentage depletion deduction for all oil and gas properties may not exceed 65 percent of the taxpayer's overall taxable income (determined before such deduction and adjusted for certain loss carrybacks and trust distributions).[9]

A taxpayer may claim percentage depletion with respect to up to 1,000 barrels of average daily production of domestic crude oil or an equivalent amount of domestic natural gas. For producers of both oil and natural gas, this limitation applies on a combined basis. All production owned by businesses under common control and members of the same family must be aggregated; each group is then treated as one producer for application of the 1,000-barrel limitation.

Special percentage depletion provisions apply to oil and gas production from marginal properties. The statutory percentage depletion rate is increased (from the general rate of 15 percent) by one percentage point for each whole dollar that the average price of crude oil (as determined under the provisions of the nonconventional fuels production credit of section 29) for the immediately preceding calendar year is less than $20 per barrel. In no event may the rate of percentage depletion under this provision exceed 25 percent for any taxable year. The increased rate applies for the taxpayer's taxable year which immediately follows a calendar year for which the average crude oil price falls below the $20 floor. To illustrate the application of this provision, the average price of a barrel of crude oil for calendar year 1999 was $15.56; thus, the percentage depletion rate for production from marginal wells was increased by four percent (to 19 percent) for taxable years beginning in 2000. The 100-percent-of-net-income limitation has been suspended for marginal wells for taxable years beginning after December 31, 1997, and before January 1, 2002. The Administration's budget for fiscal year 2002 proposes a one-year extension of this provision. Under the Administration proposal, marginal wells would continue to be exempt from the limitation during taxable years beginning in 2002.

Marginal production is defined for this purpose as domestic crude oil or domestic natural gas which is produced during any taxable year from a property which (1) is a stripper well property for the calendar year in which the taxable year begins, or (2) is a property substantially all of the production from which during such calendar year is heavy oil (i.e., oil that has a weighted average gravity of 20 degrees API or less corrected to 60 degrees Fahrenheit). A stripper well property is any oil

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[7] An independent producer is any producer who is not a "retailer" or "refiner." A retailer is any person who directly, or through a related person, sells oil or natural gas or any product derived therefrom (1) through any retail outlet operated by the taxpayer or related person, or (2) to any person that is obligated to market or distribute such oil or natural gas (or product derived therefrom) under the name of the taxpayer or the related person, or that has the authority to occupy any retail outlet owned by the taxpayer or a related person. Bulk sales of crude oil and natural gas to commercial or industrial users, and bulk sales of aviation fuel to the Department of Defense, are not treated as retail sales for this purpose. Further, a person is not a retailer within the meaning of this provision if the combined gross receipts of that person and all related persons from the retail sale of oil, natural gas, or any product derived therefrom do not exceed $5 million for the taxable year. A refiner is any person who directly or through a related person engages in the refining of crude oil, but only if such person or related person has a refinery run in excess of 50,000 barrels per day on any day during the taxable year.

[8] By contrast, for any other mineral qualifying for the percentage depletion deduction, the deduction may not exceed 50 percent of the taxpayer's taxable income from the depletable property.

[9] Amounts disallowed as a result of this rule may be carried forward and deducted in subsequent taxable years, subject to the 65-percent-of-taxable-income limitation for those years.

or gas property for which daily average production per producing oil or gas well is not more than 15 barrel equivalents in the calendar year during which the taxpayer's taxable year begins.[10] A property qualifies as a stripper well property for a calendar year only if the wells on such property were producing during that period at their maximum efficient rate of flow.

If a taxpayer's property consists of a partial interest in one or more oil- or gas-producing wells, the determination of whether the property is a stripper well property or a heavy oil property is made with respect to total production from such wells, including the portion of total production attributable to ownership interests other than the taxpayer's. If the property satisfies the requirements of a stripper well property, then each owner receives the benefits of this provision with respect to its allocable share of the production from the property for its taxable year that begins during the calendar year in which the property so qualifies.

The allowance for percentage depletion on production from marginal oil and gas properties is subject to the 1,000-barrel-per-day limitation discussed above. Unless a taxpayer elects otherwise, marginal production is given priority over other production for purposes of utilization of that limitation.

Because percentage depletion, unlike cost depletion, is computed without regard to the taxpayer's basis in the depletable property, cumulative depletion deductions may be far greater than the amount expended by the taxpayer to acquire or develop the property.

Intangible drilling and development costs

In general, costs that benefit future periods must be capitalized and recovered over such periods for income tax purposes, rather than being expensed in the period the costs are incurred. In addition, the uniform capitalization rules require certain direct and indirect costs allocable to property to be included in inventory or capitalized as part of the basis of such property. In general, the uniform capitalization rules apply to real and tangible personal property produced by the taxpayer or acquired for resale.

Special rules apply to intangible drilling and development costs ("IDCs").[11] Under these special rules, an operator (i.e., a person who holds a working or operating interest in any tract or parcel of land either as a fee owner or under a lease or any other form of contract granting working or operating rights) who pays or incurs IDCs in the development of an oil or gas property located in the United States may elect either to expense or capitalize those costs. The uniform capitalization rules do not apply to otherwise deductible IDCs.

If a taxpayer elects to expense IDCs, the amount of the IDCs is deductible as an expense in the taxable year the cost is paid or incurred. Generally, IDCs that a taxpayer elects to capitalize may be recovered through depletion or depreciation, as appropriate; or in the case of a nonproductive well ("dry hole"), the operator may elect to deduct the costs. In the case of an integrated oil company (i.e., a company that engages, either directly or through a related enterprise, in substantial retailing or refining activities) that has elected to expense IDCs, 30 percent of the IDCs on productive wells must be capitalized and amortized over a 60-month period.[12]

A taxpayer that has elected to deduct IDCs may, nevertheless, elect to capitalize and amortize certain IDCs over a 60-month period beginning with the month the expenditure was paid or incurred. This rule applies on an expenditure-by-expendi-

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[10] Equivalent barrels is computed as the sum of (1) the number of barrels of crude oil produced, and (2) the number of cubic feet of natural gas produced divided by 6,000. If a well produced 10 barrels of crude oil and 12,000 cubic feet of natural gas, its equivalent barrels produced would equal 12 (i.e., 10 + (12,000 / 6,000)).

[11] IDCs include all expenditures made by an operator for wages, fuel, repairs, hauling, supplies, etc., incident to and necessary for the drilling of wells and the preparation of wells for the production of oil and gas. In addition, IDCs include the cost to operators of any drilling or development work (excluding amounts payable only out of production or gross or net proceeds from production, if the amounts are depletable income to the recipient, and amounts properly allocable to the cost of depreciable property) done by contractors under any form of contract (including a turnkey contract). Such work includes labor, fuel, repairs, hauling, and supplies which are used in the drilling, shooting, and cleaning of wells; in such clearing of ground, draining, road making, surveying, and geological works as are necessary in preparation for the drilling of wells; and in the construction of such derricks, tanks, pipelines, and other physical structures as are necessary for the drilling of wells and the preparation of wells for the production of oil and gas. Generally, IDCs do not include expenses for items which have a salvage value (such as pipes and casings) or items which are part of the acquisition price of an interest in the property.

[12] The IRS has ruled that if an integrated oil company ceases to be an integrated oil company, it may not immediately write off the unamortized portion of the IDCs capitalized under this rule, but instead must continue to amortize those IDCs over the 60-month amortization period.

ture basis; that is, for any particular taxable year, a taxpayer may deduct some portion of its IDCs and capitalize the rest under this provision. This allows the taxpayer to reduce or eliminate IDC adjustments or preferences under the alternative minimum tax.

The election to deduct IDCs applies only to those IDCs associated with domestic properties.[13] For this purpose, the United States includes certain wells drilled offshore.[14]

Intangible drilling costs are a major portion of the costs necessary to locate and develop oil and gas reserves. Because the benefits obtained from these expenditures are of value throughout the life of the project, these costs would be capitalized and recovered over the period of production under generally applicable accounting principles.

Nonconventional fuels production credit

Taxpayers that produce certain qualifying fuels from nonconventional sources are eligible for a tax credit ("the section 29 credit") equal to $3 per barrel or barrel-of-oil equivalent.[15] Fuels qualifying for the credit must be produced domestically from a well drilled, or a facility treated as placed in service before January 1, 1993.[16] The section 29 credit generally is available for qualified fuels sold to unrelated persons before January 1, 2003.[17]

For purposes of the credit, qualified fuels include: (1) oil produced from shale and tar sands; (2) gas produced from geopressured brine, Devonian shale, coal seams, a tight formation, or biomass (i.e., any organic material other than oil, natural gas, or coal (or any product thereof); and (3) liquid, gaseous, or solid synthetic fuels produced from coal (including lignite), including such fuels when used as feedstocks. The amount of the credit is determined without regard to any production attributable to a property from which gas from Devonian shale, coal seams, geopressured brine, or a tight formation was produced in marketable quantities before 1980.

The amount of the section 29 credit generally is adjusted by an inflation adjustment factor for the calendar year in which the sale occurs.[18] There is no adjustment for inflation in the case of the credit for sales of natural gas produced from a tight formation. The credit begins to phase out if the annual average unregulated wellhead price per barrel of domestic crude oil exceeds $23.50 multiplied by the inflation adjustment factor.[19]

The amount of the section 29 credit allowable with respect to a project is reduced by any unrecaptured business energy tax credit or enhanced oil recovery credit claimed with respect to such project.

As with most other credits, the section 29 credit may not be used to offset alternative minimum tax liability. Any unused section 29 credit generally may not be carried back or forward to another taxable year; however, a taxpayer receives a credit for prior year minimum tax liability to the extent that a section 29 credit is disallowed as a result of the operation of the alternative minimum tax. The credit is limited to what would have been the regular tax liability but for the alternative minimum tax.

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[13] In the case of IDCs paid or incurred with respect to an oil gas well located outside of the United States, the costs, at the election of the taxpayer, are either (1) included in adjusted basis for purposes of computing the amount of any deduction allowable for cost depletion or (2) capitalized and amortized ratably over a 10-year period beginning with the taxable year such costs were paid or incurred.

[14] The term "United States" for this purpose includes the seabed and subsoil of those submerged lands that are adjacent to the territorial waters of the United States and over which the United States has exclusive rights, in accordance with international law, with respect to the exploration and exploitation of natural resources (i.e., the Continental Shelf area).

[15] A barrel-of-oil equivalent generally means that amount of the qualifying fuel which has a Btu (British thermal unit) content of 5.8 million.

[16] A facility that produces gas from biomass or produces liquid, gaseous, or solid synthetic fuels from coal (including lignite) generally will be treated as being placed in service before January 1, 1993, if it is placed in service by the taxpayer before July 1, 1998, pursuant to a written binding contract in effect before January 1, 1997. In the case of a facility that produces coke or coke gas, however, this provision applies only if the original use of the facility commences with the taxpayer. Also, the IRS has ruled that production from certain post-1992 "recompletions" of wells that were originally drilled prior to the expiration date of the credit would qualify for the section 29 credit.

[17] If a facility that qualifies for the binding contract rule is originally placed in service after December 31, 1992, production from the facility may qualify for the credit if sold to an unrelated person before January 1, 2008.

[18] The inflation adjustment factor for the 2000 taxable year was 2.0454. Therefore, the inflation-adjusted amount of the credit for that year was $6.14 per barrel or barrel equivalent.

[19] For 2000, the inflation adjusted threshold for onset of the phaseout was $48.07 ($23.50 x 2.0454) and the average wellhead price for that years $26.73.

The provision provides a significant tax incentive (currently about $6 per barrel of oil equivalent or $1 per thousand cubic feet of natural gas). Coalbed methane and gas from tight formations currently account for most of the credit.

Enhanced oil recovery credit

Taxpayers are permitted to claim a general business credit, which consists of several different components. One component of the general business credit is the enhanced oil recovery credit. The general business credit for a taxable year may not exceed the excess (if any) of the taxpayer's net income tax over the greater of (1) the tentative minimum tax, or (2) 25 percent of so much of the taxpayer's net regular tax liability as exceeds $25,000. Any unused general business credit generally may be carried back one taxable year and carried forward 20 taxable years.

The enhanced oil recovery credit for a taxable year is equal to 15 percent of certain costs attributable to qualified enhanced oil recovery ("EOR") projects undertaken by the taxpayer in the United States during the taxable year. To the extent that a credit is allowed for such costs, the taxpayer must reduce the amount otherwise deductible or required to be capitalized and recovered through depreciation, depletion, or amortization, as appropriate, with respect to the costs. A taxpayer may elect not to have the enhanced oil recovery credit apply for a taxable year.

The amount of the enhanced oil recovery credit is reduced in a taxable year following a calendar year during which the annual average unregulated wellhead price per barrel of domestic crude oil exceeds $28 (adjusted for inflation since 1990).[20] In such a case, the credit would be reduced ratably over a $6 phaseout range.

For purposes of the credit, qualified enhanced oil recovery costs include the following costs which are paid or incurred with respect to a qualified EOR project: (1) the cost of tangible property which is an integral part of the project and with respect to which depreciation or amortization is allowable; (2) IDCs that the taxpayer may elect to deduct;[21] and (3) the cost of tertiary injectants with respect to which a deduction is allowable, whether or not chargeable to capital account.

A qualified EOR project means any project that is located within the United States and involves the application (in accordance with sound engineering principles) of one or more qualifying tertiary recovery methods which can reasonably be expected to result in more than an insignificant increase in the amount of crude oil which ultimately will be recovered. The qualifying tertiary recovery methods generally include the following nine methods: miscible fluid displacement, steam-drive injection, microemulsion flooding, in situ combustion, polymer-augmented water flooding, cyclic-steam injection, alkaline flooding, carbonated water flooding, and immiscible non-hydrocarbon gas displacement, or any other method approved by the IRS. In addition, for purposes of the enhanced oil recovery credit, immiscible non-hydrocarbon gas displacement generally is considered a qualifying tertiary recovery method, even if the gas injected is not carbon dioxide.

A project is not considered a qualified EOR project unless the project's operator submits to the IRS a certification from a petroleum engineer that the project meets the requirements set forth in the preceding paragraph.

The enhanced oil recovery credit is effective for taxable years beginning after December 31, 1990, with respect to costs paid or incurred in EOR projects begun or significantly expanded after that date.

Conventional oil recovery methods do not recover all of a well's oil. Some of the remaining oil can be extracted by unconventional methods, but these methods are generally more costly. At current world oil prices, a large part of the remaining oil in place is uneconomic to recover by unconventional methods. In this environment, the EOR credit can increase recoverable reserves. Although recovering oil using EOR methods is more expensive than recovering it using conventional methods, it may be less expensive than producing oil from new reservoirs. Although the credit could phase out at higher oil prices, it is fully effective at present world oil prices.

Alternative minimum tax

A taxpayer is subject to an alternative minimum tax ("AMT") to the extent that its tentative minimum tax exceeds its regular income tax liability. A corporate taxpayer's tentative minimum tax generally equals 20 percent of its alternative minimum taxable income in excess of an exemption amount. (The marginal AMT rate for a noncorporate taxpayer is 26 or 28 percent, depending on the amount of its alternative minimum taxable income above an exemption amount.) Alternative min-

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[20] The average per-barrel price of crude oil for this purpose is determined in the same manner as for purposes of the section 29 credit.

[21] In the case of an integrated oil company, the credit base includes those IDCs which the taxpayer is required to capitalize.

imum taxable income ("AMTI") is the taxpayer's taxable income increased by certain tax preferences and adjusted by determining the tax treatment of certain items in a manner which negates the deferral of income resulting from the regular tax treatment of those items.

As a general rule, percentage depletion deductions claimed in excess of the basis of the depletable property constitute an item of tax preference in determining the AMT. In addition, the AMTI of a corporation is increased by an amount equal to 75 percent of the amount by which adjusted current earnings ("ACE") of the corporation exceed AMTI (as determined before this adjustment). In general, ACE means AMTI with additional adjustments that generally follow the rules presently applicable to corporations in computing their earnings and profits. As a general rule a corporation must use the cost depletion method in computing its ACE adjustment. Thus, the difference between a corporation's percentage depletion deduction (if any) claimed for regular tax purposes and its allowable deduction determined under the cost depletion method is factored into its overall ACE adjustment.

Excess percentage depletion deductions related to crude oil and natural gas production are not items of tax preference for AMT purposes. In addition, corporations that are independent oil and gas producers and royalty owners may determine depletion deductions using the percentage depletion method in computing their ACE adjustments.

The difference between the amount of a taxpayer's IDC deductions and the amount which would have been currently deductible had IDC's been capitalized and recovered over a 10-year period may constitute an item of tax preference for the AMT to the extent that this amount exceeds 65 percent of the taxpayer's net income from oil and gas properties for the taxable year (the "excess IDC preference"). In addition, for purposes of computing a corporation's ACE adjustment to the AMT, IDCs are capitalized and amortized over the 60-month period beginning with the month in which they are paid or incurred. The preference does not apply if the taxpayer elects to capitalize and amortize IDCs over a 60-month period for regular tax purposes.

IDC's related to oil and gas wells are generally not taken into account in computing the excess IDC preference of taxpayers that are not integrated oil companies. This treatment does not apply, however, to the extent it would reduce the amount of the taxpayer's AMTI by more than 40 percent of the amount that the taxpayer's AMTI would have been if those IDCs had been taken into account.

In addition, for corporations other than integrated oil companies, there is no ACE adjustment for IDCs with respect to oil and gas wells. That is, such a taxpayer is permitted to use its regular tax method of writing off those IDCs for purposes of computing its adjusted current earnings.

Absent these rules, the incentive effect of the special provisions for oil and gas would be reduced for firms subject to the AMT. These rules, however, effectively eliminate AMT concerns for independent producers.

Passive activity loss and credit rules

A taxpayer's deductions from passive trade or business activities, to the extent they exceed income from all such passive activities of the taxpayer (exclusive of portfolio income), generally may not be deducted against other income.[22] Thus, for example, an individual taxpayer may not deduct losses from a passive activity against income from wages. Losses suspended under this "passive activity loss" limitation are carried forward and treated as deductions from passive activities in the following year, and thus may offset any income from passive activities generated in that later year. Losses from a passive activity may be deducted in full when the taxpayer disposes of its entire interest in that activity to an unrelated party in a transaction in which all realized gain or loss is recognized.

An activity generally is treated as passive if the taxpayer does not materially participate in it. A taxpayer is treated as materially participating in an activity only if the taxpayer is involved in the operations of the activity on a basis which is regular, continuous, and substantial.

A working interest in an oil or gas property generally is not treated as a passive activity, whether or not the taxpayer materially participates in the activities related to that property. This exception from the passive activity rules does not apply if the taxpayer holds the working interest through an entity which limits the liability of the taxpayer with respect to the interest. In addition, if a taxpayer has any loss for any taxable year from a working interest in an oil or gas property which is treated pursuant to this working interest exception as a loss which is not from a passive activity, then any net income from such property (or any property the basis of which is determined in whole or in part by reference to the basis of such property) for any

succeeding taxable year is treated as income of the taxpayer which is not from a passive activity.

Similar limitations apply to the utilization of tax credits attributable to passive activities. Thus, for example, the passive activity rules (and, consequently, the oil and gas working interest exception to those rules) apply to the nonconventional fuels production credit and the enhanced oil recovery credit. However, if a taxpayer has net income from a working interest in an oil and gas property which is treated as not arising from a passive activity, then any tax credits attributable to the interest in that property would be treated as credits not from a passive activity (and, thus, not subject to the passive activity credit limitation) to the extent that the amount of the credits does not exceed the regular tax liability which is allocable to such net income.

As a result of this exception from the passive loss limitations, owners of working interests in oil and gas properties may use losses from such interests to offset income from other sources.

Tertiary injectants

Taxpayers are allowed to deduct the cost of qualified tertiary injectant expenses for the taxable year. Qualified tertiary injectant expenses are amounts paid or incurred for any tertiary injectant (other than recoverable hydrocarbon injectants) which is used as a part of a tertiary recovery method.

The provision allowing the deduction for qualified tertiary injectant expenses resolves a disagreement between taxpayers (who considered such costs to be IDCs or operating expenses) and the IRS (which considered such costs to be subject to capitalization).

ATTACHMENTS: NEPD GROUP REPORT PROPOSALS

EXTEND AND MODIFY CREDIT FOR FUEL PRODUCED FROM LANDFILL METHANE

Current Law

Taxpayers that produce gas from biomass (including landfill methane) are eligible for a tax credit ("the section 29 credit") equal to $3 per barrel-of-oil equivalent. For this purpose, a barrel-of-oil equivalent is the amount of gas that has a Btu (British thermal unit) content of 5.8 million. To qualify for the credit, the gas must be produced domestically from a facility placed in service by the taxpayer before July 1, 1998, pursuant to a written binding contract in effect before January 1, 1997. In addition, the gas must be sold to an unrelated person before January 1, 2008.

The amount of the section 29 credit generally is adjusted by an inflation adjustment factor for the calendar year in which the sale occurs. The inflation adjustment factor for the 2000 taxable year was 2.0454, and the inflation-adjusted amount of the credit for that year was $6.14 per barrel or barrel equivalent. The credit begins to phase out if the annual average unregulated wellhead price per barrel of domestic crude oil exceeds $23.50 multiplied by the inflation adjustment factor. For 2000, the inflation adjusted threshold for onset of the phaseout was $48.07 ($23.50 x 2.0454) and the average wellhead price for that year was $26.73.

The amount of the section 29 credit allowable with respect to a project is reduced by any unrecaptured business energy tax credit or enhanced oil recovery credit claimed with respect to such project.

The section 29 credit may not be used to offset alternative minimum tax liability. Any unused section 29 credit generally may not be carried back or forward to another taxable year; however, a taxpayer receives a credit for prior year minimum tax liability to the extent that a section 29 credit is disallowed as a result of the operation of the alternative minimum tax. The credit is limited to what would have been the regular tax liability but for the alternative minimum tax.

Reasons for Change

The tax credit helps make fuel produced from landfill methane competitive with other fuels. Extending the credit would continue the important contribution of this renewable energy source to the Nation's long-term energy supply.

Proposal

The credit would be allowed for fuel produced from landfill methane if the fuel is produced from a facility (or portion of a facility) placed in service after December 31, 2001, and before January 1, 2011, and is sold (or used to produce electricity that is sold) before January 1, 2011. The credit for fuel produced at landfills subject to EPA's 1996 New Source Performance Standards/Emissions Guidelines would be limited to two-thirds of the otherwise applicable amount beginning on January 1, 2008, if any portion of the facility for producing fuel at the landfill was placed in service

before July 1, 1998, and beginning on January 1, 2002, in all other cases. The proposal would clarify, for purposes of determining the extent to which a facility is placed in service after December 31, 2001, that the facility includes the wells, pipes, and related components used to collect landfill methane and that only production attributable to wells, pipes, and related components placed in service after December 31, 2001, is treated as produced from the portion of the facility placed in service after that date.

EXTENSION OF TAX INCENTIVES FOR ETHANOL

Current Law

Current law provides an income tax credit and an excise tax exemption for ethanol and renewable source methanol used as a fuel. In general, the income tax credit for ethanol is 53 cents per gallon, but small ethanol producers (i.e., those producing less than 30 million gallons of ethanol per year) qualify for a credit of 63 cents per gallon on the first 15 million gallons of ethanol produced in a year. A credit of 60 cents per gallon is allowed for renewable source methanol.

As an alternative to the income tax credit, gasohol blenders may claim a gasoline tax exemption of 53 cents for each gallon of ethanol and 60 cents for each gallon of renewable source methanol that is blended into qualifying gasohol.

The income tax credit expires on December 31, 2007, and the excise tax exemption expires on September 30, 2007. In addition, the ethanol credit and exemption are each reduced by 1 cent per gallon in 2003 and by an additional 1 cent per gallon in 2005. Neither the credit nor the exemption applies during any period in which motor fuel taxes dedicated to the Highway Trust Fund are limited to 4.3 cents per gallon. Under current law, the motor fuel tax dedicated to the Highway Trust Fund will be limited to 4.3 cents per gallon beginning on October 1, 2005.

Reasons for Change

The tax credit and excise tax exemption help make ethanol and renewable source methanol competitive with other fuels. Extending the credit and exemption would continue the important contribution of these renewable energy sources to the Nation's long-term energy supply.

Proposal

The income tax credit and the excise tax exemption would be extended through December 31, 2010. The current law rule providing that neither the credit nor the exemption applies during any period in which motor fuel taxes dedicated to the Highway Trust Fund are limited to 4.3 cents per gallon would be retained. As under current law, the credit and the exemption would each be reduced by 1 cent per gallon in 2003 and by an additional 1 cent per gallon in 2005.

PROVIDE TAX CREDIT FOR CERTAIN HYBRID AND FUEL CELL VEHICLES

Current Law

No generally available income tax credit for purchases of hybrid vehicles is available currently. A 10-percent tax credit is provided for the cost of a qualified electric vehicle, up to a maximum credit of $4,000. A qualified electric vehicle is a motor vehicle that is powered primarily by an electric motor drawing current from rechargeable batteries, fuel cells, or other portable sources of electric current, the original use of which commences with the taxpayer, and that is acquired for use by the taxpayer and not for resale. The full amount of the credit is available for purchases prior to 2002. The credit begins to phase down in 2002 and does not apply to vehicles placed in service after 2004.

Certain costs of qualified clean-fuel property, including clean-fuel vehicles, may be deducted when such property is placed in service. Qualified electric vehicles do not qualify for the clean-fuel vehicle deduction. The deduction begins to phase down in 2002 and does not apply to property placed in service after 2004.

Reasons for Change

The transportation sector now accounts for 67 percent of U.S. oil consumption. Cars, sport utility vehicles, light trucks, and minivans alone account for 40 percent of U.S. oil consumption, about 20 to 40 percent of all urban smog-forming emissions and 20 percent of greenhouse gas emissions. Almost all of these vehicles use a single gasoline-fueled engine.

Hybrid vehicles, which have more than one source of power on board the vehicle, and electric vehicles have the potential to reduce petroleum consumption, air pollution, and greenhouse gas emissions. The proposed credits will encourage the purchase of highly fuel efficient vehicles that incorporate advanced automotive tech-

nologies and will help to move hybrid and fuel cell vehicles from the laboratory to the highway. These vehicles can significantly reduce oil consumption, emissions of air pollutants, and emissions of carbon dioxide, the most prevalent greenhouse gas.

Proposal

The proposal would provide temporary tax credits for certain hybrid and fuel cell vehicles:

(1) *Credit for qualified hybrid vehicles*. A credit, of up to $4,000, would be available for purchases of qualified hybrid vehicles after December 31, 2001, and before January 1, 2008. The credit would be:

(a) $250 if the rechargeable energy storage system provides at least 5 percent but less than 10 percent of the maximum available power;

(b) $500 if the rechargeable energy storage system provides at least 10 percent and less than 20 percent of the maximum available power;

(c) $750 if the rechargeable energy storage system provides at least 20 percent and less than 30 percent of the maximum available power; and

(d) $1,000 if the rechargeable energy storage system provides 30 percent or more of the maximum available power.

If the vehicle's fuel economy exceeds the 2000 model year city fuel economy, the amount of credit shown in (a) through (d) above would be increased by the following amounts:

(i) $500 if the vehicle achieves at least 125 percent but less than 150 percent of the 2000 model year city fuel economy;

(ii) $1,000 if the vehicle achieves at least 150 percent but less than 175 percent of the 2000 model year city fuel economy;

(iii) $1,500 if the vehicle achieves at least 175 percent but less than 200 percent of the 2000 model year city fuel economy;

(iv) $2,000 if the vehicle achieves at least 200 percent but less than 225 percent of the 2000 model year city fuel economy;

(v) $2,500 if the vehicle achieves at least 225 percent but less than 250 percent of the 2000 model year city fuel economy; and

(vi) $3,000 if the vehicle achieves at least 250 percent of the 2000 model year city fuel economy.

(2) *Credit for qualified fuel cell vehicles*. A credit of up to $8,000 would be available for the purchase of new qualified fuel cell vehicles after December 31, 2001, and before January 1, 2008. The credit would be $4,000, but, if the vehicle's fuel economy exceeds the 2000 model year city fuel economy, the credit would increase by the following amounts:

(i) $1,000 if the vehicle achieves at least 150 percent but less than 175 percent of the 2000 model year city fuel economy;

(ii) $1,500 if the vehicle achieves at least 175 percent but less than 200 percent of the 2000 model year city fuel economy;

(iii) $2,000 if the vehicle achieves at least 200 percent but less than 225 percent of the 2000 model year city fuel economy;

(iv) $2,500 if the vehicle achieves at least 225 percent but less than 250 percent of the 2000 model year city fuel economy;

(v) $3,000 if the vehicle achieves at least 250 percent but less than 275 percent of the 2000 model year city fuel economy;

(vi) $3,500 if the vehicle achieves at least 275 percent but less than 300 percent of the 2000 model year city fuel economy; and

(vii) $4,000 if the vehicle achieves at least 300 percent of the 2000 model year city fuel economy.

The 2000 model year city fuel economy would be the following:

If the vehicle inertia weight class is—	The 2000 model year city fuel economy is—	
	For a passenger automobile—	For a light truck—
1,500 or 1,750 lbs	43.7 mpg	37.6 mpg
2,000 lbs	38.3 mpg	33.7 mpg
2,250 lbs	34.1 mpg	30.6 mpg
2,500 lbs	30.7 mpg	28.0 mpg
2,750 lbs	27.9 mpg	25.9 mpg
3,000 lbs	25.6 mpg	24.1 mpg
3,500 lbs	22.0 mpg	21.3 mpg
4,000 lbs	19.3 mpg	19.0 mpg
4,500 lbs	17.2 mpg	17.3 mpg

If the vehicle inertia weight class is—	The 2000 model year city fuel economy is—	
	For a passenger automobile—	For a light truck—
5,000 lbs	15.5 mpg	15.8 mpg
5,500 lbs	14.1 mpg	14.6 mpg
6,000 lbs	12.9 mpg	13.6 mpg
6,500 lbs	11.9 mpg	12.8 mpg
7,000 or 8,500 lbs	11.1 mpg	12.0 mpg

AAAAAThe ''vehicle inertia weight class'' is defined in regulations prescribed by the Environmental Protection Agency for purposes of title II of the Clean Air Act.

A qualifying hybrid vehicle is a motor vehicle that draws propulsion energy from on-board sources of stored energy which are both: (1) an internal combustion engine or heat engine using combustible fuel, and (2) a rechargeable energy storage system. A qualifying fuel cell vehicle is a motor vehicle that is propelled by power derived from one or more cells which convert chemical energy directly into electricity by combining oxygen with hydrogen fuel which is stored on board the vehicle and may or may not require reformation prior to use. A qualifying vehicle must meet all applicable regulatory requirements.

Maximum available power means the maximum value available from the battery or other energy storage device, during a standard power test, divided by the sum of the battery or other energy storage device and the SAE net power of the heat engine.

These credits would be available for all qualifying light vehicles including cars, minivans, sport utility vehicles, and light trucks. Taxpayers would be able to claim only one of the credits per vehicle and taxpayers who claim either credit would not be able to claim the qualified electric vehicle credit or the deduction for clean-fuel vehicle property for the same vehicle. Business taxpayers claiming either credit would be subject to the limitations on the general business credit and would be required to reduce the basis of the vehicle by the amount of the credit.

INVESTMENT CREDIT FOR COMBINED HEAT AND POWER (CHP) SYSTEMS

Current law

Combined heat and power (CHP) systems are used to produce electricity (and/or mechanical power) and usable thermal energy from a single primary energy source. Depreciation allowances for CHP property vary by asset use and capacity. Assets employed in the production of electricity used by the taxpayer in an industrial manufacturing process or plant activity (and not ordinarily available for sale to others) have a general cost recovery period of 15 years if rated with total capacity in excess of 500 kilowatts. Electricity production assets of lesser-rated capacity generally are classified with other manufacturing assets and have cost recovery periods of five to ten years. Assets used in the production of electricity for sale have either a 15-year or 20-year recovery period. For assets that are structural components of buildings, however, the recovery period is either 39 years (if nonresidential) or 27.5 years (if residential), and the straight-line method for computing depreciation allowances must be used. For assets with recovery periods of 10 years or less, the 200 percent declining balance method may be used to compute depreciation allowances. The 150 percent declining balance method may be used for assets with recovery periods of 15 or 20 years. No income tax credit is provided currently for investment in combined heat and power property.

Reasons for change

Combined heat and power systems utilize thermal energy that is otherwise wasted in producing electricity by more conventional methods. CHP systems achieve a greater level of overall energy efficiency, and thereby lessen the consumption of primary fossil fuels, lower total energy costs, and reduce carbon emissions. An investment tax credit for CHP assets is expected to encourage increased energy efficiency by accelerating planned investments and inducing additional investments in such systems. The increased demand for CHP equipment should, in turn, reduce CHP production costs and spur additional technological innovation in improved CHP systems.

Proposal

The proposal would establish a 10-percent investment credit for qualified CHP systems with an electrical capacity in excess of 50 kilowatts or with a capacity to

produce mechanical power in excess of 67 horsepower (or an equivalent combination of electrical and mechanical energy capacities). CHP property would be defined as property comprising a system that uses the same energy source for the simultaneous or sequential generation of (1) electricity or mechanical shaft power (or both) and (2) steam or other forms of useful thermal energy (including heating and cooling applications). A qualified CHP system would be required to produce at least 20 percent of its total useful energy in the form of thermal energy and at least 20 percent of its total useful energy in the form of electrical or mechanical power (or a combination thereof) and would also be required to satisfy an energy-efficiency standard. For CHP systems with an electrical capacity in excess of 50 megawatts (or a mechanical energy capacity in excess of 67,000 horsepower), the total energy efficiency of the system would have to exceed 70 percent. For smaller systems, the total energy efficiency would have to exceed 60 percent. For this purpose, total energy efficiency would be calculated as the sum of the useful electrical, thermal, and mechanical power produced by the system at normal operating rates, measured on a Btu basis, divided by the lower heating value of the primary fuel source for the system supplied. The credit would be allowed with respect to qualified CHP property only if its eligibility is verified under regulations prescribed by the Secretary of the Treasury.

Investments in qualified CHP assets that are otherwise assigned cost recovery periods of less than 15 years would be eligible for the credit, provided that the taxpayer elected to treat such property as having a 22-year class life. Thus, regular tax depreciation allowances would be calculated using a 15-year recovery period and the 150 percent declining balance method.

The credit would be treated as an energy credit under the investment credit component of the section 38 general business credit, and would be subject to the rules and limitations governing that credit. Taxpayers using the credit for CHP equipment would not be entitled to any other tax credit for the same equipment.

The credit would apply to investments in CHP equipment placed in service after December 31, 2001, but before January 1, 2007.

STATEMENT OF THE ELECTRIC VEHICLE ASSOCIATION OF THE AMERICAS

Introduction

This testimony is presented on behalf of the Electric Vehicle Association of the Americas (EVAA), a national non-profit organization of electric and other energy providers, vehicle manufacturers and suppliers, state and local governments and other entities that have joined together to advocate greater use of electricity as a transportation fuel. A complete membership list is attached. A principal activity of the association is to advocate the adoption of incentive-based policies and programs to facilitate the development and use of electric modes of transportation.

The Role of Electricity in the National Transportation System

The Association believes that use of electricity as a fuel offers significant advantages in transportation applications. Electricity is inexpensive, stable and generated from a variety of domestic fuels. Electric transportation technologies present our nation with an important means for reducing our dependency on foreign petroleum and increasing the diversity of fuels relied upon in the transportation sector. During the last energy crisis in 1973, only 36 percent of oil used in the U.S. was imported. Today, the U.S. imports 19.1 million barrels of foreign oil per day and the U.S. Department of Energy reports that net imports of petroleum in the year 2001 will account for 54 percent of total U.S. petroleum demand—an increase of 18 percentage points from 1973. And in the next twenty years, the Energy Information Administration (EIA) predicts that this nation's demand for oil will increase by an additional 33 percent. EIA also predicts that gasoline prices—already at $2.00 per gallon in some regions of the country—could spike even higher during the summer peak-driving season.

It is clear that the need for this country to transition to the use of alternative fuels is more critical than ever. A wide variety of transportation modes—individual passenger and light-duty vehicles—and heavy-duty vehicles, like buses and trolleys—can and should be powered by electricity—an abundant, clean, and domestically produced energy resource. All of the technologies mentioned above will reduce pollution, reduce our dependency on imported oil, and improve the quality of life in many of our cities and towns, while maintaining our high degree of mobility.

In addition to diversifying sources of transportation "fuels," air quality considerations also are requiring municipal transit operators to consider the use of alternative fuel technologies as a means to reduce emissions and achieve air quality

goals. Nearly 100 cities in the United States do not meet federally established air quality standards. For many urban areas, electric transportation may be a particularly important means to substantially reduce emissions of mobile source pollutants, including volatile organic compounds and oxides of nitrogen that are the precursors of smog. Electric cars and buses are truly "zero emission" transportation modes. They produce no tailpipe emissions and generate insignificant, ancillary emissions during operations. They also have the added benefit of mitigating noise pollution and improving efficiency.

The State of Electric Drive Technologies

While each major automobile manufacturer, domestic and foreign, now has offered battery-electric vehicles (BEVs) for sale and/or lease on a limited basis, these products entered the market later than anticipated, and subsequently, the market has not developed as quickly as envisioned by industry and government. Since 1996, a total of 4,017 BEVs have been leased and/or sold in the United States. Additionally, there are approximately 200 battery electric buses in operation throughout the United States. Some automakers also have begun to develop and market small, neighborhood electric vehicles (NEVs) that have applications in planned communities, college campuses, in station car applications, and other urban settings where space and travel distances are limited. Finally, there is growing use of non-road and industrial EVs, especially at airports located in urban areas.

Hybrid electric vehicles (HEVs) also are making inroads in the marketplace. To date, Honda and Toyota have leased and/or sold over 12,480 HEVs in the United States and other automobile manufacturers have announced plans to introduce hybrids into the marketplace in the next two to three years. There also is an interest among environmentalists, regulators, the electric utility industry and others to pursue development of grid-connected hybrid technologies as a means to improve the environmental performance of such technologies.

Fuel cell electric vehicles (FCEVs), which harness the chemical energy of hydrogen and oxygen to generate electricity, have the potential to change the way we think about energy and transportation. Fuel cells are more efficient than other technologies that rely on direct combustion, and they produce zero, or near zero emissions. All of the major automakers are investing heavily to develop fuel cell technology and each has announced plans to offer fuel cell vehicles to the commercial marketplace by the end of the decade.

Because EVs of all types are radically different from their internal combustion engine (ICE) counterparts, there are several challenges that must be overcome. Today, the challenges to the increased use of electric modes of transportation remain the **cost** of the vehicles, the **limited availability of charging infrastructure**, and **consumer awareness** and acceptance of the technology. For example, in order to achieve the range standard (100 miles per charge) that industry believes is necessary for BEVs to be commercially successful, the vehicles must use advanced batteries, such as nickel metal hydride, that are far more expensive and add to the incremental cost of the vehicle.

Also, as is the case with BEVs and FCEVs, a new infrastructure system—whether it is electric chargers or hydrogen refueling stations—must be developed to support these technologies. There will be a significant cost associated with building a sufficient number of electric chargers and hydrogen refueling stations.

The Need for Federal Tax Incentives

The Energy Policy Act of 1992 (P.L. 102–486 "EPAct") recognized the benefits that can be gained by using alternative fuels and electric modes of transportation by including modest, targeted tax credits for battery, fuel cell and certain hybrid-electric vehicles and supporting infrastructure. However, these tax credits are scheduled to begin phasing-out in 2002 and to expire in 2004. This timing will not provide the necessary incentives to support the introduction of these electric drive technologies.

EVAA believes that targeted tax incentives can be the most effective means by which government could help assure that electric drive technologies are successfully introduced into the marketplace. While the Association believes that incentives should be limited in their scope and duration, they must be available, and sufficient **now and in the immediate future**, as these new and dramatically different technologies are being introduced to consumers. Without this critical, immediate assistance, it is unlikely that we will reap the full potential of environmental and energy benefits promised by widespread use of electric modes of transportation.

Many Members of Congress—Republicans as well as Democrats—have recognized the role that limited and targeted tax incentives can play in overcoming the current market barriers to assure large-scale commercialization of electric drive technologies. EVAA applauds the leadership several members of this Committee—spe-

cifically Representatives Mac Collins (R–GA), John Lewis (D–GA), Dave Camp (R–MI), and Sander Levin (D–MI)—have provided in years past to pursue legislation that provides the types of modest tax incentives necessary to make these advanced technology vehicles more affordable and acceptable in the marketplace.

To date, three bills that seek to address this country's energy dilemma have been introduced in the Senate during the 107th Congress. Senator Frank Murkowski (R–AK), Chairman of the Senate Energy and Natural Resources Committee, has introduced the National Energy Security Act of 2001 (S. 389). Senator Jeff Bingaman (D–NM), Ranking Member of the Senate Energy and Natural Resources Committee, has introduced the Comprehensive and Balanced Energy Policy Act of 2001 (S. 597). And, Senator Orrin Hatch (R–UT) has introduced the Clean Efficient Automobiles Resulting from Advanced Car Technologies Act of 2001 (S. 760, the CLEAR Act). All three proposals include—in whole or in part—tax incentives to encourage the purchase and use of electric vehicles and other advanced transportation technologies and supporting infrastructure. (See attachment for a summary of the major provisions of these bills.)

Comprehensive energy legislation also is being discussed in the House, and it is clear that policymakers are focusing on the important role that advanced transportation technologies can, and must, play in the development of a sound national energy policy. Just this week, the Democratic Caucus' Energy Task Force released its blueprint for addressing the nation's energy dilemma. Also, Representative David Camp (R–MI) introduced the Clean Efficient Automobiles Resulting from Advanced Car Technologies Act of 2001 (H.R. 1864—the CLEAR Act), companion legislation identical to the bill introduced by Senator Hatch in the Senate.

As gasoline prices continue to rise and Congress moves forward with energy legislation, EVAA urges you to look beyond the benefits gained by increasing supply, to the energy security and environmental benefits gained by supporting modest, consumer-based tax incentives for electric drive technologies.

Attachments

ELECTRIC VEHICLE ASSOCIATION OF THE AMERICAS

Membership List

July 10, 2001

Advanced Vehicle Systems
Air Products and Chemicals, Inc.
American Honda Motor Company, Inc.
American MagLev Technologies, Inc.
American Public Power Association
Avestor (Hydro Quebec)
Atlantic Center for the Environment
Azure Dynamics Corporation
Baker Equipment Engineering Company
Ballard Power Systems
Carolina EV Coalition
CEREVEH
Chattanooga Area Regional Transportation Authority
CITELEC
City of Atlanta/Bureau of Motor Transport Services
City of Burbank
City of New York
Compact Power, Inc.
Copper Development Association
Curtis Instruments
DaimlerChrysler Corporation
Delta Airlines
Dominion Virginia Power
Dynasty Motorcar Corporation
Ecostar Electric Drive Systems
Edison Electric Institute
Electricité de France
Electric Vehicle Infrastructure
Electric Vehicle Association of Canada
Electric Vehicle Association of Great Britain
Energy Conversion Devices/Ovonic
Enova Systems
EPRI
ERIM
Florida Power and Light Company
Ford Motor Company
General Energy Technologies Inc.
General Motors Corporation
Global Electric MotorCars, LLC
Hydro-Quebec
IMPCO Technologies Inc.
International Lead Zinc Research Organization, Inc.
Long Island Power Authority
Massachusetts Division of Energy Resources
Maxwell Energy Products
Mid-Del Lewis Eubanks AVTS
National Rural Electric Cooperative Association
New York Power Authority
New York State Technology Enterprise Corporation
Nissan North America/Nissan R&D
Northeast Sustainable Energy Association (NESEA)
NYSERDA
Potomac Electric Power Company
Powercell Corporation
PSA Peugeot-Citroen/USTR
Sacramento Municipal Utility District
SAFT America, Inc.
Salt River Project
Saminco
San Bernardino Associated Governments
Solectria Corporation
Southern California Economic Partnership
Southern California Edison Company
Southern Company/Georgia Power Company
Technologies M4
Tennessee Valley Authority
Texaco, Inc.
3M
Tokyo Electric Power Company
Total EV
Toyota Motor Corporation/Toyota Motor Sales, USA
Unique Mobility, Inc.
University of California, Davis/ITS
University of South Florida
US Department of Energy
Volkswagen
Voltage Vehicles
York Technical College

Bold denotes EVAA Board member.

LEGISLATIVE LANDSCAPE OF EV RELATED TAX INCENTIVES AND POLICIES
INTRODUCED IN THE 107TH CONGRESS

EXISTING LAW	**Electric Vehicle (EV) and Alternative Fuel Vehicle (AFV) Tax Provisions – The Energy Policy Act of 1992 (P.L. 102-486)** □ 10% tax credit, up to $4,000, available to businesses and individuals that purchase a BEV, FCEV or a hybrid EV that is "primarily powered" by electricity before December 31, 2004. The credit begins to phase out in 2002 and sunsets December 31, 2004. □ $100,000 tax deduction available to businesses for installation of clean-fuel (including electricity) refueling property. Deduction available on property placed into service before December 31, 2004. □ A tax deduction, based on the incremental cost of the vehicle, for clean-fuel vehicles from $2,000 to $50,000 depending on the gross vehicle weight (gvw). The deduction begins to phase out in 2002 and sunsets in 2004. **EV-Related Incentives Included in the Taxpayer Relief Act of 1997 (P.L. 105-34)** □ Exempts BEVs from federal excise "luxury" taxes. □ Exempts BEVs from "luxury" depreciation schedules.			
LEGISLATION INTRODUCED 107TH CONGRESS	**National Energy Security Act of 2001** S. 389 – Murkowski (R-AK)	**Comprehensive and Balanced Energy Policy Act of 2001** S. 597 – Bingaman (D-NM)	**Clean Efficient Automobiles Resulting From Advanced Car Technologies Act** S. 760 – Hatch (R-UT) H.R. 1864 – Camp (R-MI)	**Administration's National Energy Policy** Report from the National Energy Policy Development Group – not yet legislation
COSPONSORS	Senators: Allard (R-CO), Bennett (R-UT), Breaux (D-LA), Brownback (R-KS), Burns (R-MT), Campbell (R-CO), Craig (R-ID), Domenici (R-NM), Hagel (R-NE), Hutchinson (R-AR) Hutchison (R-TX), Inhofe (R-OK), Lott (R-MS), Shelby (R-AL), Stevens (R-AK), Thomas (R-CA), Voinovich (R-OH)	Senators: Akaka (D-HI), Baucus (D-MT), Breaux (D-LA), Cantwell (D-WA), Daschle (D-ND), Dorgan (D-IL), Feinstein (D-CA), Johnson (D-SD), Kennedy (D-MA), Leahy (D-VT), Murray (D-WA), Reid (D-NV), Rockefeller (D-WV), Schumer (D-NY), Torricelli (D-NJ)	Senators: Chafee (R-RI), Collins (R-ME), Crapo (R-ID), Ensign (R-NV), Jeffords (I-VT), Kerry (D-MA), Lieberman (D-CT), Rockefeller (D-WV), G. Smith (R-OR), Snowe (R-ME) Representatives: Bono (R-CA), Cannon (R-UT), Dunn (R-WA), Ramstad (R-MN), Upton (R-MI)	
BEV TAX CREDITS	• Provides a tax credit (10% of the vehicle cost or $4,250, whichever is less) for battery-electric vehicles (BEVs) with a top-rated speed below 50 miles per hour (mph) through 2007. • Provides a tax credit from $4,250 to $42,500 based on gross vehicle weight (gvw) for BEVs through 2007. • Provides a tax credit of $6,375 for BEVs with a driving range of at least 100 miles between charges or BEVs with a payload capacity of 1,000 lbs. or more through 2007.	• Requires the Secretary of Transportation to develop/implement "mechanisms" to cap petroleum use in light-duty vehicles at no more than 5% above the 2000 level by 2008. [Note: **Mechanisms is defined to include tax incentives to promote the use of *highly-efficient and/or alternative fuel vehicles*.**[1] [1]Highly-efficient and alternative fuel vehicles not defined.	• Provides a tax credit of 10% up to $4,000 for low-speed BEVs through 2007. • Provides a $4,000 tax credit for passenger and light-duty BEVs, with an additional $2,000 credit for BEVs with a driving range of at least 100 miles on a single charge or capable of a payload capacity of at least 1,000 lbs through 2007. • Provides a $10,000 tax credit for BEVs with a gvw of 8,500 lbs - 14,000 lbs through 2007. • Provides a $20,000 tax credit for BEVs with a gvw of 14,000 lbs - 26,000 lbs through 2007. • Provides a $40,000 tax credit for BEVs with a gvw of > 26,000 lbs through 2007.	None

LEGISLATION INTRODUCED 107TH CONGRESS	National Energy Security Act of 2001 S. 389 – Murkowski (R-AK)	Comprehensive and Balanced Energy Policy Act of 2001 S. 597 – Bingaman (D-NM)	Clean Efficient Automobiles Resulting From Advanced Car Technologies Act S. 760 – Hatch (R-UT) H.R. 1864 – Camp (R-MI)	Administration's National Energy Policy Report from the National Energy Policy Development Group – not yet legislation
FCEV TAX CREDITS	• Provides a tax credit from $4,250 to $42,500 based on gross vehicle weight (gvw) for fuel cell electric vehicles (FCEVs) propelled by a combination of electricity and an alternative fuel through 2007.	• Same provision as described under BEV Tax Credit (See above).	• Provides a $4,000 tax credit based on gvw for fuel cell electric vehicles (FCEVs) that meet specific air quality levels through 2011. Provides an additional tax credit from $1,000 to $4,000 for light-duty FCEVs that meet specific vehicle mileage performance criteria (150–300 % increase over MY 2000 city fuel economy) through 2011. • Provides a $10,000 tax credit for FCEVs with a gvw of 8,500 lbs - 14,000 lbs through 2007. • Provides a $20,000 tax credit for FCEVs with a gvw of 14,000 lbs - 26,000 lbs through 2007. • Provides a $40,000 tax credit for FCEVs with a gvw of ≥ 26,000 lbs through 2007.	• Recommends that a temporary, efficiency-based income tax credit be available for the purchase of FCEVs from 2002 through 2007.

LEGISLATION INTRODUCED 107TH CONGRESS	National Energy Security Act of 2001 S. 389 – Murkowski (R-AK)	Comprehensive and Balanced Energy Policy Act of 2001 S. 597 – Bingaman (D-NM)	Clean Efficient Automobiles Resulting From Advanced Car Technologies Act S. 760 – Hatch (R-UT) H.R. 1864 – Camp (R-MI)	Administration's National Energy Policy Report from the National Energy Policy Development Group – not yet legislation
HEV TAX CREDITS	▪ Provides a tax credit from $500 to $2,000 for hybrid electric vehicles (HEVs) less than 8,500 lbs gvw, based on maximum available power from the rechargeable energy storage system, through 2008.	▪ Same provision as described under BEV Tax Credit (See above).	▪ Provides a tax credit from $250 to $1,000 for HEVs less than 8,500 lbs gvw, based on maximum available power from the rechargeable energy storage system, through 2007. Provides an additional tax credit from $500 to $3,000 for light-duty HEVs that meet specific vehicle mileage performance criteria (125-300 % increase over MY 2000 city fuel economy) through 2007. ▪ Provides a tax credit (see below) for medium and heavy-duty HEVs that achieve certain air quality emissions levels through 2007: 10,000 – 14,000 lbs gvw $1,500 - $2,500 14,000 – 26,000 lbs gvw $4,000 - $6,000 ≥26,000 lbs gvw $6,000 - $10,000 ▪ Provides an additional tax credit (see below) for medium and heavy-duty HEVs that use "cleaner" engines, based on gvw and decrease over time through 2007: 10,000 – 14,000 lbs gvw $3,500 - $1,500 14,000 – 26,000 lbs gvw $9,000 - $4,000 ≥26,000 lbs gvw $14,000 - $6,000	▪ Recommends that a temporary, efficiency-based income tax credit be available for the purchase of HEVs from 2002 through 2007.

LEGISLATION INTRODUCED 107TH CONGRESS	National Energy Security Act of 2001 S. 389 – Murkowski (R-AK)	Comprehensive and Balanced Energy Policy Act of 2001 S. 597 – Bingaman (D-NM)	Clean Efficient Automobiles Resulting From Advanced Car Technologies Act S. 760 – Hatch (R-UT) H.R. 1864 – Camp (R-MI)	Administration's National Energy Policy Report from the National Energy Policy Development Group – not yet legislation
AFV TAX CREDITS	▪ Provides a tax credit from $5,000 to $50,000 - based on gvw and on 85% of the incremental costs of the vehicle, for dedicated alternative fuel vehicles (AFVs) that meet the most stringent (non-ZEV) emissions certification standards for that make and model year through 2007.	▪ Same provision as described under BEV Tax Credit (See above).	▪ Provides a tax credit, based on 50% of the incremental costs of the vehicle ($5,000 to $40,000 based on gvw), for dedicated AFVs (defined to include only CNG, LNG, LPG, hydrogen, and M-85) through 2007. ▪ Tax credit provided above shall be increased by an additional 30% of the incremental costs of the dedicated AFV ($5,000 to $40,000 based on gvw), if the AFV meets the most stringent (non-ZEV) emissions certification standards for that make and model year through 2007.	None
GOVERNMENT/ NON-TAXPAYING ENTITY TAX INCENTIVE	None	None	▪ Allows a taxpayer that sells/leases a vehicle eligible for the tax benefits under this legislation to a government or other non-tax paying entity to claim the tax benefit so long as the value of the tax benefit is clearly disclosed and included in a reduced cost for the sale/lease of the vehicle.	None
ALTERNATIVE FUEL INCENTIVES	▪ Provides a $0.25 per gallon, gasoline equivalent, tax credit for alternative fuels (as defined in EPAct) through 2007.	None	▪ Provides a $0.50 per gallon, gasoline equivalent, tax credit for alternative fuels (CNG, LNG, LPG, Hydrogen, M85) through 2007.	None
INFRASTRUCTURE INCENTIVES	▪ Extends the existing $100,000 tax deduction for clean-fuel (including electricity) refueling property through 2007. ▪ Provides a $30,000 tax deduction for the costs to install EV charging technology through 2007.	None	▪ Extends the existing $100,000 tax deduction for clean-fuel (including electricity) refueling property through 2007. ▪ Provides a tax credit of 100% - up to $30,000 – of the costs to install public charging infrastructure through 2007. ▪ Provides a tax credit of 50% - up to $1,000 - of the aggregate cost for the home installation of charging infrastructure through 2007.	None

LEGISLATION INTRODUCED 107TH CONGRESS	National Energy Security Act of 2001 S. 389 – Murkowski (R-AK)	Comprehensive and Balanced Energy Policy Act of 2001 S. 597 – Bingaman (D-NM)	Clean Efficient Automobiles Resulting From Advanced Car Technologies Act S. 760 – Hatch (R-UT) H.R. 1864 – Camp (R-MI)	Administration's National Energy Policy Report from the National Energy Policy Development Group – not yet legislation
OTHER PERTINENT PROVISIONS	▪ Grants single occupant AFVs access to high-occupancy vehicle (HOV) lanes. ▪ Directs federal agencies, by the end of FY 2005, to use alternative fuel (as defined by EPAct) for at least 50% of the total volume of fuel used by each agency. No more than 25% of fuel purchased by State and local governments at federally owned refueling facilities may be included by an agency in meeting this requirement. ▪ Requires the Secretary of Energy to establish a program ($100 million/year from FY 2002 through FY 2006) for making grants (no more than $1 million each) to local governments for covering the incremental cost of AFVs. ▪ Federal agencies may include AFVs owned by States or local governments in any commercial arrangements for fueling of federal AFVs. ▪ Expenditures made on the acquisition/installation of the fuel or needed infrastructure necessary to operate/maintain AFVs can be valued, as a infrastructure credit, for the purpose of meeting federal and State fleet, and alternative fuel provider requirements (as directed by EPAct).	▪ Grants single occupant AFVs access to high-occupancy vehicle (HOV) lanes. ▪ Requires federal fleets to use alternative fuel for at least 50% of the total annual volume of fuel used in AFVs by 2003, and 75% of the total annual volume of fuel used by 2005. ▪ Requires the Secretary of Transportation to develop/implement "mechanisms" to cap petroleum use in light-duty vehicles at no more than 5% above the 2000 level by 2008. [Note: **Mechanisms is defined to include new programs to promote the use of high-efficiency vehicles and AFVs.**]	None	▪ Highlights the Administration's commitment to investing in Department of Transportation (DOT) programs including: Intelligent Transportation Systems (ITS); the Fuel Cell Transit Bus Program; and, the Clean Bus Program. ▪ Recommends that the President direct DOT and the Environmental Protection Agency (EPA) work with the trucking industry to establish a program to reduce emissions and fuel consumption from long-haul trucks at truck stops by implementing alternatives to idling, such as ***electrification and auxiliary power units*** at truck stops along interstate highways. ▪ Recommends that the President direct the Secretary of Energy to conduct a review of current funding and historic performance of energy efficiency research and development (R&D) programs. Also recommends that the Secretary of Energy propose appropriate funding for those R&D programs that are performance-based and modeled on public-private partnerships. ▪ Recommends that the President direct the Secretary of Energy to develop next-generation technologies – including ***hydrogen***, as well as focus R&D efforts on integrating current programs regarding ***hydrogen, fuel cells and distributed energy***.

STATEMENT OF FPL ENERGY, LLC

[SUBMITTED BY DEAN R. GOSSELIN, DIRECTOR, FPL ENERGY, LLC]

I. INTRODUCTION

Chairman Baucus, Senator Grassley, and distinguished members of the committee, my name is Dean R. Gosselin. I am a Director at FPL Energy, LLC. In addition to my role at FPL Energy, until June of this year I also served as President

of the American Wind Energy Association which represents the interests of the domestic wind energy industry. I thank you for providing me the opportunity to testify on behalf of FPL Energy, LLC to talk about the role of tax incentives in energy policy.

FPL Energy's primary business is producing electricity from clean energy sources. Approximately 80% of FPL Energy's generation capacity in operation is based on clean fuel sources, including wind, hydro, biomass, solar thermal power, geothermal, and natural gas. FPL Energy currently has power plants in operation in 13 states across the United States. Among all of the renewable energy technologies, we believe wind energy is currently the most economically viable renewable resource and has the greatest potential to add significant, clean electrical power across a broad range of geographic regions in the United States in the near term.

FPL Energy is the largest developer and operator of wind energy facilities in the nation with more than 1,800 megawatts (MW) of wind turbines in operation or under construction in eight states: California, Iowa, Kansas, Minnesota, Oregon, Texas, Washington and Wisconsin.

I want to commend the members of this committee, Senators Grassley (R–IA), Conrad (D–ND), Jeffords (I–VT), Breaux (D–LA), Murkowski (R–AK) and Kerry (D–MA) for their leadership in supporting S. 530 to extend the production tax credit (PTC) for wind power codified in Section 45 of the Internal Revenue Code. It is important to note that the PTC will expire at the end of this year. I hope the Congress will take swift action to extend the PTC.

II. FPL ENERGY LLC'S COMMITMENT TO THE CONTINUED DEVELOPMENT OF WIND ENERGY RESOURCES

FPL Energy strongly believes that, since its inception in 1992, the PTC has proven to be a sound investment and is an excellent example of a federal policy initiative that has successfully achieved many of its original goals. The PTC has served as a catalyst that has stimulated the development of many large utility scale wind projects in the United States. Given FPL Energy's significant experience with wind power and our first hand familiarity with the positive role that Section 45 has played in stimulating new wind development, we would like to share our thoughts with the committee on the constructive role we believe the PTC has played. This emphasis is particularly critical given the fact that the PTC has been so successful and yet will expire at the end of this year unless Congress takes action to extend it beyond 2001.

III. BACKGROUND ON THE WIND ENERGY PTC

The wind energy PTC, enacted as part of the Energy Policy Act of 1992, provides an inflation-adjusted 1.5 cents/kilowatt-hour (kWh) credit for electricity produced with wind equipment for the first ten years of a project's life. The credit is only available if the wind equipment is located in the United States and electricity is generated and sold in the marketplace. The credit applies to electricity produced by a qualified wind energy facility placed in service after December 3, 1993, and before January 1, 2002.

IV. WHY WE NEED A WIND ENERGY PTC

A. THE WIND ENERGY PTC STIMULATES NEW WIND DEVELOPMENT BY HELPING DRIVE DOWN COSTS, MAKING WIND ENERGY AN ECONOMICAL SOURCE OF CLEAN, RENEWABLE POWER

The cost competitiveness of wind generated electric energy has increased dramatically since the inception of the industry in the early 1980s. The wind turbine technology of the 1980s was in its infancy and the cost of wind energy during this time period exceeded 25 cents/kWh. Since that time, however, wind production costs have been reduced by a remarkable 80% to the current cost of approximately 4.5 cents/kWh. The 1.5 cent/kWh PTC stimulates new wind power development by assisting wind in competing with fossil fuel generating sources, which based on historical averages cost around 3.0 cents/kWh.

With the continued support of the PTC, it is expected that wind costs will continue to decline as wind turbine technology continues to improve and more efficient manufacturing economies of scale are able to be realized. Through further turbine development and manufacturing efficiencies, the wind energy industry anticipates that the cost of wind energy will continue to be reduced until wind can compete head-to-head with fossil fuels without the need for any incentives.

The most significant factor contributing to the dramatic reduction in U.S. wind energy production costs over the last two decades has been the dramatic improve-

ment in turbine efficiency. Since the 1980s, several generations of new and improved turbines have been developed, with each generation improving upon its predecessor. As a result, better blade designs, improved computer controls, and extended machine component lives have been achieved, which in turn have reduced the lifecycle costs of energy generated by wind turbines. Proven machine technology has evolved from the 50kW machines of twenty years ago to the 1,650kW machines of today that have the capacity to satisfy the energy demands of as many as 550 homes.[1] Moreover, new turbines in the range of 2,000 to 3,000 kW are currently under testing and development, which will further improve the technology's efficiency and reduce wind power costs.

With the continued support of the PTC, we anticipate that research and development will continue, and as a result, turbine costs will continue to decline. We are confident that future generations of wind turbines, along with improved efficiencies in manufacturing economies of scale, will sufficiently lower costs to allow wind to directly compete with fossil fuel generated electric energy. An extension of the PTC will help bridge the gap as wind moves closer to cost competitiveness with fossil fuels.

B. THE WIND ENERGY PTC IS HELPING DEVELOP AN IMPORTANT ALTERNATIVE CLEAN ENERGY SOURCE WITH SIGNIFICANT POTENTIAL TO ADD NEW ELECTRICAL GENERATING CAPACITY

The severe shortage of electricity currently being experienced in the Western United States graphically points to the critical need for Congress to support the development of alternative energy sources in the United States. Throughout the West, shortages of electricity have led authorities to call for stepped up construction of new power plants. But, even the speediest construction of conventional fossil fuel plants takes years to bring on-line. By contrast, new wind plants can often be brought on-line in months.

For example, in California, where the electricity shortage is the most acute, FPL Energy has identified 525MW of new wind power potential that it believes could be developed in California over the next twelve months. In addition, FPL Energy estimates it could repower another 100MW at its existing wind plants in California over the next 12 months. Finally, FPL Energy believes there is the potential of at least another 500MW of new wind power at other sites in California that could be developed over the next 18 months. In other words, FPL Energy believes that, if the PTC continues to be available, there is the potential to develop new wind power capacity in California of at least 1,125MW over the next 18 months. This is enough new power to serve approximately 400,000 homes.[2]

Also, along the Washington-Oregon border near Walla Walla, Washington, FPL Energy is currently constructing and expects to have on-line by year-end what will be one of the world's largest wind plants. At a capacity of 300MW, FPL Energy's new Stateline Wind Generating Project will produce enough electricity to serve the needs of some 70,000 homes, enough energy to serve about one-third of the residential customers in Portland, Oregon.

Importantly, over the long term the addition of new energy sources such as wind in California and in the Northwest can bring much needed price stability to the energy marketplace.

C. WIND IS GREEN POWER THAT CAN CONTRIBUTE TO THE REDUCTION OF GREENHOUSE EMISSIONS

Wind-generated electricity is an environmentally friendly form of renewable energy that produces no greenhouse gas emissions or ground water pollution. In fact, a single 750KW wind turbine can displace, by replacing the combustion of fossil fuels, up to 1,500 tons of CO2 emissions per year.

Significant reductions of greenhouse gas emissions in the United States can only be achieved through the combined use of many new, energy-efficient technologies, including those used for the production of renewable energy. The extension of the PTC will assure the continued availability of wind power as a clean, renewable energy source.

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[1] One megawatt (MW) (or 1,000 kW) of current technology installed wind capacity serves approximately 300 to 350 homes.

[2] FPL's estimates contained herein are based on its most current research of new wind development potential in California over the next 18 months. The ability to develop this potential could be significantly impacted by economic and regulatory restrictions and/or difficulties, including but not limited to the availability of the wind energy PTC and access to transmission.

D. WIND POWER HAS SIGNIFICANT ECONOMIC GROWTH POTENTIAL

1. DOMESTIC

Wind power projects currently operating across the country generate approximately 2,500MW of electric power—enough energy to serve as many as 700,000 homes—in states as geographically diverse as the following: Alaska, California, Colorado, Hawaii, Iowa, Kansas, Michigan, Minnesota, Nebraska, New Mexico, New York, North Dakota, Oregon, Pennsylvania, Texas, Vermont, Wisconsin, and Wyoming. With the appropriate commitment of resources to wind energy projects, the American Wind Energy Association estimates that wind energy could generate power to as many as 10 million homes by the end of the next decade.

The domestic wind energy market has significant potential for future growth because, as the sophistication of wind energy technology continues to improve, new geographic regions in the United States become suitable for wind energy production. The top twenty states for future wind energy potential include: [3]

STATE	kWhs (in billions)
1. North Dakota	1,210
2. Texas	1,190
3. Kansas	1,070
4. South Dakota	1,030
5. Montana	1,020
6. Nebraska	868
7. Wyoming	747
8. Oklahoma	725
9. Minnesota	657
10. Iowa	551
11. Colorado	481
12. New Mexico	435
13. Idaho	73
14. Michigan	65
15. New York	62
16. Illinois	61
17. California	59
18. Wisconsin	58
19. Maine	56
20. Missouri	52

AAASource: ***An Assessment of the Available Windy Land Area and Wind Energy Potential in the Contiguous United States***, Pacific Northwest Laboratory, 1991.

A. WIND POWER PROJECTS CAN SERVE AS A VALUABLE SOURCE OF SUPPLEMENTAL INCOME FOR FARMERS AND RANCHERS AND NEW ECONOMIC GROWTH OPPORTUNITIES FOR RURAL AREAS

Some of America's most productive farming and ranching regions are also some of the most promising areas for wind development. Since wind projects and farming and ranching are fully compatible—wind plants can operate with little or no displacement of crops or livestock—lease payments made by wind developers can serve as a valuable source of stable, additional income for ranchers and farmers. In Iowa, for example, wind farms are currently paying approximately $640,000/year in land rent.

Also, importantly, wind projects bring valuable new economic opportunities to areas, often rural, where wind projects are located, including increased local tax bases, new manufacturing opportunities and construction and ongoing operational and maintenance jobs. FPL Energy estimates its new Stateline project will add millions of dollars in revenue to the local Walla Walla, Washington economy, and will create an average of 150 new construction jobs with a peak need of 350 workers, and for on-going operations provide 8 to 15 new full-time jobs and 4 to 7 new part-time jobs.

B. CONTINUED GROWTH OF DOMESTIC WIND INDUSTRY WILL PROVIDE ECONOMIC BENEFITS TO OTHER SECTORS OF THE U.S. ECONOMY

In addition to the benefits cited above which wind plants provide for farmers, ranchers and the rural communities where wind farms are sited, the U.S. wind industry provides many economic benefits to other sectors of the U.S. economy. For example, FPL Energy has had steel wind towers manufactured in Louisiana, North

Dakota, Texas, and Utah; wind turbines manufactured in California, Illinois, and Texas; transformers manufactured in Missouri, Pennsylvania, and Wisconsin; and wind turbine components manufactured in Colorado, Georgia, Iowa, and Washington.

2. INTERNATIONAL

The global wind energy market has been growing at a remarkable rate over the last several years and is the world's fastest growing energy technology. The growth of the market offers significant export opportunities for United States wind turbine and component manufacturers. The World Energy Council has estimated that new wind capacity worldwide will amount to $150 to $400 billion worth of new business over the next twenty years. The current worldwide market for wind turbines is approximately $4 billion per annum, and growing rapidly. Unfortunately, most of this manufacturing capacity, and its attendant job creation, is currently located in Denmark. Experts estimate that as many as 157,000 new jobs could be created if United States wind energy equipment manufacturers are able to capture just 25% of the global wind equipment market over the next ten years.

E. THE IMMEDIATE EXTENSION OF THE WIND ENERGY PTC IS CRITICAL

Since the wind energy PTC is a production credit available only for energy actually produced from new facilities, the credit is inextricably tied to the financing, permitting, construction, and continued successful operation of new facilities. With the credit due to expire in less than five months, January 1, 2002, it is very difficult for wind energy developers plan for new wind power projects post-2001. The immediate extension of the wind energy PTC is therefore critical to the continued development of wind power in the United States.

V. CONCLUSION

We strongly believe Congress should enact a long term extension of the PTC. Since its inception, the PTC has proven to be an excellent investment. It has served as a catalyst that has stimulated significant development of new wind energy resources across the United States. We believe the extension of the PTC will ensure that FPL Energy and other energy companies continue to make the investments necessary to ensure the long-term role of wind energy in our national energy mix.

Thank you for providing FPL Energy LLC with this opportunity to testify.

STATEMENT OF LUBRIZOL CORPORATION

The Lubrizol Corporation of Wickliffe, Ohio, hereby submits the following comments requesting a change in the Federal excise tax imposed on certain diesel fuel formulations. Such a change would provide equitable tax treatment for a more environmentally-sound fuel formulation.

I. OVERVIEW

Diesel fuel is the primary fuel used by trucks and buses. It is an efficient fuel, but one that emits air pollutants—nitrogen oxides ("NOx") and particulate matter ("PM"). The Federal excise tax on diesel fuel is 24.4 cents per gallon. To reduce tailpipe emissions of NO_x and PM, some marketers are beginning to mix commercial, on-highway diesel fuel with a significant amount of water and a small amount of additive to produce water-diesel fuel emulsions.

Taxation of such emulsions at the diesel fuel rate places their users at a competitive disadvantage and discourages the use of this environmental-enhancing fuel. Congress should redress this inequity.

II. WATER-DIESEL FUEL EMULSIONS

A. Emulsions

Chemical engineers for years have been able to mix water and diesel fuel. However, creating a stable emulsion is difficult because the water and the diesel fuel never combine chemically: the two fluids separate, and the water sinks to the bottom. Recently, chemical additives have been developed that can maintain emulsions of water and diesel fuel for several months, even though the fluids do not combine.

Water-diesel fuel emulsions generally contain approximately 77 percent diesel fuel by weight, 3 percent additives and 20 percent water.[1] The diesel fuel and the additive (80 percent by weight of the emulsion) are the energy-generating components of the fuel. Water provides no energy and, of course, cannot propel a vehicle. It is estimated that a gallon of a water-diesel fuel emulsion has about 80 percent of the energy content of a gallon of diesel fuel.

B. PuriNO$_x$™ Water-Diesel Fuel Emulsions

Under one such technology, PuriNO$_x$™, the water, diesel and a small amount of chemical additive are placed in a special unit that elongates the water molecules and breaks them into very small droplets. The chemical additive then attaches to the droplets. It prevents the water from coming in contact with any metal components of a vehicle's engine—avoiding corrosion, and it inhibits the droplets from coalescing and forming larger drops that would eventually settle out of the emulsion. Without further processing, the water droplets remain suspended in the diesel fuel. Adding water to diesel fuel has significant environmental benefits. It: (1) lowers the combustion temperature of the fuel, thereby reducing NO_x emissions by up to 30 percent, and (2) delays combustion of the fuel, thereby reducing PM emissions by up to 50 percent.

The PuriNO$_x$™ emulsion can be dispensed and burned in both old and new trucks and buses just as conventional diesel fuel. It does not require engine modification or complex maintenance of the fuel in storage.

III. UNFAIR TAX TREATMENT

A. Tax "Above the Terminal Rack"

The water displaces approximately 20 percent by weight of the fuel in a water-diesel fuel emulsion without supplying 20 percent of the energy value. Users of the lower-energy content water-diesel fuel emulsion must purchase more gallons to drive the same number of miles. Thus, if water-diesel fuel emulsions are taxed at the diesel rate of 24.4 cents per gallon, users would unfairly pay 20 percent more tax than users of conventional diesel fuel.

The Federal excise tax is dedicated to the Highway Trust Fund. A basic principle of highway taxes is that users of the highway system should be taxed in relation to their use of that system. Thus, the tax rate should be reduced on water-diesel emulsions by 20 percent to reflect their energy equivalence. Users of conventional diesel fuel and users of water-diesel fuel emulsions would then pay the same amount of tax to travel the same distance. There is ample precedent for such action.[2] In 1997, Congress reduced the tax rates on several special fuels including propane, liquefied natural gas, and methanol derived from natural gas, to reflect the energy content of those fuels relative to gasoline. Those fuels had been taxed at the same rate as gasoline, a fuel with which they compete. Users of those special fuels were also paying more tax to travel the same number of miles.

The principle that tax rates should be reduced on water-diesel fuel emulsions to reflect their energy equivalence also has been recognized abroad. There is special tax treatment for water-diesel fuel emulsions in the U.K., France, Switzerland, the Netherlands and Italy. The European Union has authorized its Member States to impose their Federal excise tax only on the percentage of the emulsion that is diesel fuel; the percentage that is water is exempt. This action is based on a recognition that the water component has no energy content. It also recognizes that the emulsion provides significant environmental benefits.

B. Tax "Below the Terminal Rack"

At times, petroleum distributors may wish to add water to diesel fuel and create a water-diesel fuel emulsion after the diesel fuel has been taxed at the terminal rack. Again, addition of the water adds no BTU content and does not propel the vehicle. Thus, there should be no difference in tax treatment regardless of whether the emulsion is created "above" or "below" the terminal rack because in either case the full amount of taxable diesel fuel will have been subject to taxation. "Above the rack," the tax should be set at a rate to reflect the emulsion's BTU content; "below the rack," there should be no additional tax imposed on the water. A new subsection 4041(a)(1)(D) could be added to clarify that "liquid other than gasoline," which is subject to tax under Section 4041(a)(1), does not include water added to diesel fuel

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[1] These quantities vary slightly in winter formulations designed to address cold weather operation.

[2] *See* section 4041(a)(2) of the Internal Revenue Code of 1986, as amended by P.L. 105–34, § 907(a)(1) (reducing the rates of taxation on propane, liquified natural gas, and methanol derived from natural gas).

to form an emulsion. Such an amendment would ensure consistent treatment throughout the Tax Code.

IV. CONCLUSION

Accordingly, the Congress should, consistent with its prior action on taxes for special fuels, make the following amendments:

For removals or sales "above the rack":

1. Reduce the tax rate by 20 percent (from 24.4 to 19.7 cents per gallon) to account for the 20 percent water content in water-diesel fuel emulsions by amending Section 4081(a)(2)(A); and

For sales "below the rack":

2. Add new subsection 4041(a)(1)(D) stating that the "liquid other than gasoline" that is subject to taxation under section 4041(a)(1) will not include any water added to diesel fuel after the diesel fuel has been taxed at the point of collection.

These proposals would thus eliminate an inequity within the Tax Code.

Thank you.

STATEMENT OF THE METHANOL INSTITUTE

This testimony is presented on behalf of the Methanol Institute ("MI"), the national trade association for the U.S. methanol industry. As the voice of the methanol industry, MI has been a leader in supporting essential research and promoting the use of methanol in zero-emission fuel cell vehicles.

The Methanol Institute is pleased to endorse S. 760 and H.R. 1864, the Clean Efficient Automobiles Resulting from Advanced Car Technologies Act of 2001 ("the CLEAR Act"), legislation introduced this year by Senator Orrin Hatch (R-Utah) and Congressman Dave Camp (R-Michigan). The CLEAR Act would help level the playing field between the cost of advanced technology vehicles and conventional vehicles by providing tax credits to consumers who purchase hybrid electric, fuel cell, battery electric, and dedicated alternative fuel vehicles. In addition, the bill would provide incentives for the development of an alternative fuels infrastructure. The bill places a limit on the duration of the tax credits, time enough to allow production numbers to increase to the point that the new technology vehicles become price competitive with conventional vehicles.

Among the primary benefits of this legislation are more energy independence and cleaner air. Transportation in the United States accounts for two-thirds of our oil consumption, and 97 percent of our transportation needs depend on foreign oil. If we are going to reduce our dependence on foreign oil and cut pollution, we must focus on conserving and diversifying our transportation fuels. By promoting the use of alternative fuels and the purchase of advanced car technologies, the CLEAR Act would play a key role in our nation's energy security. Every alternative fuel or advanced technology car, truck, or bus on the road will displace a conventional vehicle's lifetime of emissions and need for imported oil. The use of dedicated alternative fuel vehicles, methanol and other fuel cell electric vehicles, battery electric vehicles and hybrids will have the added benefit of reducing greenhouse gases while providing consumers with increased choices.

The need to encourage the use of alternative technology vehicles has never been greater. Americans now drive more than 2.5 trillion miles annually and the collective odometer keeps rising. In 1998, 121 regions in our country failed to attain the Environmental Protection Agency's National Ambient Air Quality Standards. This status directly threatens the quality of life of more than 100 million of our citizens who must bear the health and economic burdens associated with non-attainment. With important programs such a California's Zero-Emission Vehicle mandate set for launch in 2003, consumers need to know that the government is interested in helping them reduce air pollution in their communities. The CLEAR Act will reduce the incremental costs to consumers to purchase cleaner vehicle technologies and help them become a part of the solution.

Historically, consumers have faced three basic obstacles to accepting the use of alternative fuels and advanced technologies. These are the cost of the vehicles, the cost of alternative fuels and the lack of infrastructure of alternative fueling stations. The CLEAR Act would lower all three of these barriers.

Specifically, the CLEAR Act would provide a tax credit of 50 cents per gasoline gallon equivalent for the purchase of alternative fuel, including methanol, at fuel stations. To ensure that consumers have better access to alternative fuel, the CLEAR Act extends until 2008 the existing $100,000 deduction for the capital costs of installing alternative fueling stations. The bill also provides a 50 percent credit

for the installation costs of retail and residential fueling property, up to $30,000 and $1,000, respectively.

Furthermore, the CLEAR Act provides tax credits to consumers to purchase alternative fuel and advanced technology vehicles. The duration of the tax credits are limited to six years for qualified alternative fuel motor vehicles and ten years for fuel cell motor vehicles. To ensure that the tax benefit provided translates into a corresponding benefit to the environment, the fuel cell vehicle tax credit is split into two parts. First, a base tax credit of $4,000 is provided for the purchase of qualified fuel cell vehicles which may use any fuel, including methanol. A bonus credit of up to $4,000 is then provided based on the vehicle's fuel efficiency. In this way, the CLEAR Act provides the greatest impact in terms of providing a social benefit to our citizens.

The CLEAR Act is supported by a broad and diverse coalition including the alternative fuels industry, environmental groups, and automobile manufacturers. President Bush's National Energy Plan also endorses the concepts of the proposal.

The Methanol Institute believes that a comprehensive national energy strategy would not be complete without an incentive that promotes the use of alternative fuels and advanced car technologies. Accordingly, MI urges the Committee to give favorable consideration to the CLEAR Act as Congress continues to develop a comprehensive national energy strategy.

STATEMENT OF THE NATIONAL READY MIXED CONCRETE ASSOCIATION AND THE WASTE MANAGEMENT

[SUBMITTED BY JULIE R. LUTHER AND ROBERT EISENBUD]

We appreciate the opportunity to submit this statement for inclusion in the record of the Committee's recent hearing on tax incentives for vehicles and alternative fuels on behalf of the members of the National Ready Mixed Concrete Association, Waste Management, and others who own and operate ready mixed concrete and sanitation trucks. In particular, we ask that the Committee consider the need to enact S. 875, the Fuel Tax Equalization Credit for Substantial Power Takeoff Vehicles Act. This bill is designed to remove a disincentive to energy conservation and environmental protection by upholding a long-held principle in the application of the Federal fuels excise tax, and restoring this principle for certain single engine "dual-use" vehicles.

This long-held principle is simple: fuel consumed for the purpose of moving vehicles over the road is taxed, while fuel consumed for "off-road" purposes is *not* taxed. The tax is designed to compensate for the wear and tear impacts on roads. Fuel used for a non-propulsion "off-road" purpose has no impact on the roads. It should not be taxed as if it does. S. 875 is based on this principle, and it remedies a problem created by IRS regulations that control the application of the federal fuels excise tax to "dual-use" vehicles.

Dual-use vehicles are vehicles that use fuel both to propel the vehicle on the road, and also to operate separate, on-board equipment. The two prominent examples of dual-use vehicles are concrete mixers, which use fuel to rotate the mixing drum, and sanitation trucks, which use fuel to operate the compactor. Both of these trucks move over the road, but at the same time, a substantial portion of their fuel use is attributable to the non-propulsion function.

The current problem developed because progress in technology has outstripped the regulatory process. In the past, dual-use vehicles commonly had two engines. IRS regulations, written in the 1950s, specifically exempt the portion of fuel used by the separate engine that operates special equipment such as a mixing drum or a trash compactor. These IRS regulations reflect the principle that fuel consumed for non-propulsion purposes is *not* taxed.

Today, however, typical dual-use vehicles use only one engine. The single engine both propels the vehicle over the road and powers the non-propulsion function through "power takeoff." A major reason for the growth of these single-engine, power takeoff vehicles is that they use less fuel. And a major benefit for everyone is that they are better for the environment. The use of two engines would add weight to the truck, thereby decreasing payload and increasing the number of trips each truck must take. Two engines would require two fuel tanks, and would significantly increase air emissions. It would also require increased use of anti-freeze, motor oil, and maintenance.

Power takeoff was not in widespread use when the IRS regulations were drafted, and the regulations deny an exemption for fuel used in single-engine, dual-use vehicles. The IRS defends its distinction between one-engine and two-engine vehicles

based on possible administrative problems if vehicle owners were permitted to allocate fuel between the propulsion and non-propulsion functions. In a test court case on the validity of the IRS regulatory approach, the government successfully defended the regulation on the basis that the statute *permitted* the IRS to impose tax on all fuel used in dual-use vehicles. The government argued that IRS' decision to allow an exemption only in the case of two, separate engines was justified by concerns about the feasibility of administering an exemption for single engines with power takeoff. (Government's brief filed April 5, 1994, in *Western Waste Industries v. Commissioner*, pp. 28, 33) The Tax Court upheld the validity of the regulation.

S. 875 is designed to address the administrative concerns expressed by the IRS, but at the same time, the bill restores tax fairness for dual-use vehicles with one engine that powers both the propulsion and non-propulsion functions. The bill does this by establishing an annual tax credit available for taxpayers that own a licensed and insured concrete mixer or sanitation truck with a compactor. The amount of the credit is $250 and is a conservative estimate of the excise taxes actually paid, based on information compiled on typical sanitation trucks and concrete mixers. We have submitted this information to the Joint Committee on Taxation.

In sum, as a fixed income tax credit, no audit or administrative issue will arise about the amount of fuel used for the off-road purpose. At the same time, the credit provides a rough justice method to make sure these taxpayers are not required to pay tax on fuels that they shouldn't be paying. Also, as an income tax credit, *the proposal would have no effect on the highway trust fund*.

Finally, this approach is not without precedent in the Code or in the practice of the states. Section 34 of the Code allows a credit against income tax to be claimed in an amount equal to the amount of excise tax a taxpayer paid in any year on several other "off-road" type activities. At the state level, a majority of the states allow taxpayers to claim a credit or a refund for a portion of the state's share of the fuel excise tax to reflect fuel use for power takeoff. At least 18 states permit taxpayers to establish the percentage of power takeoff fuel use by metering or through other evidence. Another 11 states specify a percentage of excise taxes paid on total fuel use, averaging about 30 percent for concrete mixers and sanitation trucks, that is exempted from excise tax.

We believe that the IRS interpretation of the law is not consistent with long-held principles under the tax law, despite their administrative concerns. Quite simply, the law should not condone a situation where taxpayers are required to pay the excise tax on fuel attributable to non-propulsion functions. For these reasons, we suggest that S. 875 should not be viewed as creating a new tax credit for taxpayers. It is an overdue correction of an unfair tax that should have never been imposed in the first place.

As you consider tax measures that deal specifically with energy conservation and efficiency, we hope you will consider including this initiative to restore a modicum of fairness to the tax code for owners of substantial power takeoff vehicles who are unjustly penalized for their support and use of energy efficient and environmentally preferable equipment.

STATEMENT OF THE NATIONAL PROPANE GAS ASSOCIATION

NPGA is the national trade association of the LP-gas (principally propane) industry with a membership of about 3,700 companies, including 39 affiliated state and regional associations representing members in all 50 states. Although the single largest group of NPGA members are retail marketers of propane gas, the membership includes propane producers, transporters and wholesalers, as well as manufacturers and distributors of associated equipment, containers and appliances. Propane gas is used in over 18 million installations nationwide for home and commercial heating and cooking, in agriculture, in industrial processing, and as a clean air alternative engine fuel for both over-the-road vehicles and industrial lift trucks.

NPGA urges the Committee to give careful consideration to two issues. The first relates to improving energy reliability and would provide for full expensing of propane storage facilities. The second issue is geared toward improving environmental quality through the use of cleaner burning alternative transportation fuels.

FUEL STORAGE INCENTIVE

Proposed Fuel Storage Incentive

NPGA urges the Committee to support the following provision which is contained in both the Republican and Democratic energy bills:

SEC. _____. FULL EXPENSING OF HOME HEATING OIL AND PROPANE STORAGE FACILITIES

(a) IN GENERAL.—Section 179(b) of the Internal Revenue Code of 1986 (relating to limitations) is amended by adding at the end the following—

"(5) FULL EXPENSING OF HOME HEATING OIL AND PROPANE STORAGE FACILITIES—Paragraphs (1) and (2) shall not apply to section 179 property which is any storage facility (not including a building or its structural components) used in connection with the distribution of home heating oil or liquefied petroleum gas."

Background

Fuel price spikes are caused by many factors, including demand surges that result from interruptible fuel contracts and distribution bottlenecks caused by severe weather. Additional fuel storage capacity will help insulate consumers from the economic effects of volatile fuel prices.

The traditional model whereby fuel producers would generate and store adequate supplies in preparation for the heating season has been supplanted by a new model based on the philosophy of "just-in-time" inventory. While producers attempt to shift more of the responsibility for storage to retailers and consumers, downstream storage capacity has not increased accordingly. *In fact, total existing storage at the retail level is less than 4% of annual retail sales and of total storage capacity*. Several economic and regulatory barriers exist which discourage additional storage. For instance, the regulatory costs of expanding existing bulk storage facilities have risen dramatically in the last decade. In a growing number of markets across the country, the cost of permitting new storage routinely exceeds the capital value of the expansion project.

Increasing fuel storage capacity will effectively mitigate many factors that contribute to fuel price spikes such as distribution bottlenecks caused by severe weather and demand surges that are the result of interruptible contracts. New storage, particularly at the retail level, may also dispel market fears that are brought on by lower than normal inventories at the producer level and which invariably drive prices higher.

Two options exist for enhancing storage capacity. The first establishes the federal government as "intervener" in the energy marketplace (i.e. creation of regional reserves). The second option, supported by NPGA, offers a more effective, market-driven solution in which fuel providers are provided an incentive to invest in additional storage. This incentive will help offset the economic and regulatory impediments that discourage investments in infrastructure. The added storage capacity brought on line by passage of a federal storage incentive will help shield consumers from the effects of short-term price spikes.

S. 760—THE CLEAR ACT

The members of NPGA also urge the committee to support S. 760. Senators Hatch and Rockefeller introduced the CLEAR Act last April. The bi-partisan bill now has eleven co-sponsors and would provide significant tax incentives for the use of alternative fuels and alternative fuel vehicles. It would also establish much needed incentives for investment in alternative fuel infrastructure.

Propane is the most widely used alternative transportation fuel in the nation, and indeed the world. In fact, approximately 266,000 vehicles operate on propane in the United States. Over 5.6 million propane-powered vehicles are in operation worldwide.

The Committee should note that legislation recently reported out of the House Committee on Ways and Means incorporates some of the provisions contained in the CLEAR Act. Specifically, the provisions relating to alternative fuel vehicle credits were included in legislation passed by the full House Committee.

While NPGA supports the action taken on the House side, we believe the measures embraced by the House fall short of what is required to achieve significant market penetration of clean fuel vehicles. We believe the House legislation should be improved upon by this committee, particularly through the inclusion of those provisions of the CLEAR Act (Sec. 5) that establish credits for the sale of alternative motor fuels.

The committee should note that many countries throughout the world have established successful alternative fuel vehicle programs. Although vehicle acquisition incentives have worked to increase the use of clean fuel vehicles, significant deployment of these vehicles has been more readily achieved by offering meaningful tax incentives applied to fuels rather than vehicles.

The members of NPGA appreciate the attention paid by the Committee to energy related issues and we thank you for this opportunity to articulate our views.

STATEMENT OF NEW MEXICO OIL AND GAS ASSOCIATION

[SUBMITTED BY BOB GALLAGHER]

I appreciate the opportunity to submit these written comments urging your support for legislation to extend the Section 29 tax credit for non-conventional fuels. The Section 29 issue is one that is important not only for natural gas producers in New Mexico and other states, but also for natural gas consumers across the country.

Section 29 credit was enacted in 1980, at a time of deep concern about U.S. dependence on imported oil. The goal was to encourage production of oil and natural gas from non-conventional sources, like Devonian shale, tight rock formations and coalbeds. Formations like these are widely scattered across the country, and represent a vital American resource, but non-conventional gas costs more to produce than other gas at similar depths. For example, artificial fracturing may be required for wells to flow, adding more than 50% to the cost of a new well. Operating costs are significantly higher, since de-watering, gas clean-up and added compression can double the cost of well operations.

An important point to understand about Section 29 is that it actually worked as Congress intended. The Gas Technology Institute recently studied the history of the provision, as well as the potential impact of an extension, and concluded that Section 29 succeeded in the past, and could again have a significant impact on gas supply at a critical time.

Basically, GTI said:

- Passage of Section 29 caused production of non-conventional gas to almost triple, and led to innovation in drilling and completion technology.
- Production of non-conventional gas must double, once again, if the U.S. is to meet growing demand, and not become even more dependent on oil imports.
- Even with new technologies, non-conventional gas continues to be more expensive to produce.
- Extending the credit will have a significant near-term impact on consumer prices, since Section 29 gas can reach the market relatively quickly.

In other words, Section 29 was effective, and clearly resulted in increased supplies of natural gas, as well as lower consumer prices. Today, however, Section 29 applies only to wells completed before Dec. 31, 1992, and even for these qualifying wells it is scheduled to expire on Dec. 31, 2002.

New Mexico has substantial gas reserves found in the kinds of hard-to-reach formations addressed by Section 29. Production from these formations continues to be expensive, however, and expiration of Section 29 could result in the plugging and abandonment of many of the wells that do qualify. On the other hand, as history demonstrates, an extension of the credit to at least some of the production from new, non-conventional wells could result in vital new gas supply.

The Section 29 credit is needed to unlock marginal supplies of natural gas. While gas prices recently have been high, producers—and their bankers—have learned the hard way about price volatility. Without Section 29 to protect them, they simply cannot make the substantial investments needed to produce gas from difficult sources. An extension of Section 29 will play a vital role in encouraging domestic supply, and assuring the availability of natural gas for high quality power generation, for home heating, and for a growing list of other uses.

I appreciate the opportunity to submit these remarks to the hearing record.

STATEMENT OF PLACID REFINING COMPANY LLC

[SUBMITTED BY DAN ROBINSON, PRESIDENT & CEO]

Mr. Chairman and Members of the Committee:

I appreciate the opportunity to submit a statement for the hearing record to discuss the outlook for the small refining industry in the United States.

Placid Refining Company LLC is a privately owned independent refiner. The company owns and operates a refinery located in Port Allen, Louisiana with a rated capacity of 50,000 barrels per day. This facility produces roughly 50% of its output as gasoline and another 40% as military jet fuel and diesel fuel suitable for on-road use. The company is not engaged in retail marketing. Rather, it wholesales its fuel production throughout the Southern and Southeastern regions of the United States.

Placid is certified as a small refiner under both the Small Business Administration (SBA) and the Environmental Protection Agency (EPA) guidelines.

Under the SBA guidelines, Placid is representative of 36 small refining companies operating 40 refineries, and having total refining capacities of 75,000 barrels per day or less. While this group owns about 26% of the nation's operable refineries they represent only about 5.5% of the total national refining capacity.

Under the EPA small refiner guidelines Placid is representative of 43 small refining companies, which have a total refining capacity of 155,000 barrels per day or less. This group owns and operates 57 refineries or about 38% of the nation's operating refineries, comprising about 8.6% of the total national capacity.

The Challenges for Small Refiners

These refineries are located in diverse regions all over the United States. Some are located in remote areas and serve as the nearest and best source of fuels for the regional inhabitants; some are specially designed to refine the specific grades of crude oil produced in their immediate locales; some produce specialty products and solvents; some produce asphalt; some concentrate on lube oils. Many provide reliable supplies of jet fuel for the United States armed forces, and most contribute to the nation's fuel supplies. All are important to the economy of our nation and the closure of any would be an irretrievable loss.

Yet, if the history of the last twenty-five years tells us anything it is that more closures are virtually inevitable. Since 1975 the number of operable refineries in the United States has dwindled from about 300 to about 150. Most of these casualties were small refineries owned by small refiners. According to U.S. Energy Secretary Abraham, about 50 U.S. refineries have closed in the last 10 years alone, the most recent being the Premcor refinery in Blue Island, Illinois. Not coincidentally, this 10-year period commenced with the enactment of the Clean Air Act of 1990. Massive investments have been required of the refining industry to produce cleaner burning fuels and to reduce stationary source emissions.

Unfortunately these investments have proved to produce little or no return and have served to drain resources away from the other more economically productive endeavors. The recent enactment of ultra-low sulfur regulations for both diesel fuel and gasoline by the EPA portend more of the same, which is of particular concern to small refiners who have less resources and more limited access to capital than the larger refining companies.

During the last 25 years, not a single new refinery has been constructed in the United States due to insufficient economic justification and increasingly onerous permitting requirements. Instead, the capacity lost by these refinery closures has been replaced solely by expanding the remaining refineries. This strategy may not be sustainable indefinitely, but it appears to be the only near term practical way to increase refinery capacity in this country.

The remaining operating refineries should be encouraged to employ their resources for the purpose of expansion. Certainly, any impediments to such expansion should be addressed wherever they are encountered. At the present, it is becoming apparent that refinery capacity in the United States, which was once abundant, is now becoming severely strained. The demand for transportation fuels can now only be met when the industry is operating at full capacity. There is little room for unexpected shutdowns without creating local supply disruptions, which can result in or contribute to regional price spikes.

Small refiners face a number of formidable challenges, which must be successfully met if this trend is to be halted. The refining industry has proven to be a low return business over the past twenty-five years. By virtue of their size alone, small refiners are at a competitive disadvantage to their larger peers in the struggle to capture a share of these already thin margins.

Since economies of scale take on a particular importance in the refinery industry, small refiners see the need to focus their attention and resources on expansion of both capacity and complexity in order to improve their competitive position and insure their survival. However, certain regulatory impediments and requirements are posing challenges to this focus. In addition, low profitability and limited access to capital force small refiners to be very judicious with their investment strategies. I would like to focus on two particular areas where tax legislation might be constructive in preserving this vital segment of the refining industry. The first of these addresses the capacity limitations imposed in Section 613A of the Internal Revenue Code, and the second addresses tax relief related to the capital investments required to comply with the newly enacted EPA regulations for the reduction of sulfur in gasoline and diesel fuels.

Internal Revenue Code Section 613A

While larger refiners are moving forward with efforts to expand their refineries some small refiners face a serious impediment to doing the same due to a limitation imposed in Section 613A of the Internal Revenue Code. Section 613A allows an independent producer to claim percentage depletion on an annual average daily production of up to 1,000 barrels of oil per day, and to expense certain intangible drilling costs, provided that the producer meets certain tests. Included among these tests is the requirement of having little or no ownership in a refinery which runs more than 50,000 barrels of crude oil "on any single day" during the taxable year. The effect of the "on any single day" language is to prohibit a small refiner from using any excess capacity to replace production lost from planned or unplanned outages. It is proposed that the language be modified to provide that the 50,000 barrel per day limit be imposed on a "annual average" basis rather than on an "any single day" basis.

In order to meet the "on any single day" test, a refiner must run less than 50,000 barrels per day every day to allow for inadvertent errors in metering and gauging. In addition, refiners must shut down or reduce runs during certain days of the year for scheduled or unscheduled maintenance. The requirement that refinery runs cannot exceed 50,000 barrels per day "on any single day" does not allow the refiner any flexibility to recover from its lost runs. The effect of this limitation is that small refiners must process on average, significantly less than 50,000 barrels per day in order to avoid the loss of independent producer status to its owners and affiliates. Consequently, a small refiner capable of processing up to or more than 50,000 barrels per day is discouraged from the most efficient use of its assets. Moving from the archaic "on any given day" requirement to a "annual average" will obviously allow refiners of this size to run more efficiently.

Moreover, in light of the views publicly expressed by President Bush, Vice President Cheney, and Secretary Abraham, and shared by many in Congress, that expansion of refining capacity in the United States should be a national priority, we believe it is appropriate that the 50,000 barrel per day threshold in Section 613A should be raised to a higher level. Raising this limit would remove an important impediment to expansion of refineries owned by independent producers.

Section 613A was enacted in 1975. Since that time the trend has been for refineries to grow by expanding existing capacity. As noted earlier, many small refineries have been closed and those that cannot expand face increasing competitive pressures from those that can. Other regulatory bodies have recognized that ceilings higher than 50,000 barrels per day are now appropriate for defining a small refiner. The Small Business Administration has adopted a definition, which requires a small refiner to have a capacity of no more than 75,000 barrels per day and a maximum of 1,500 employees. Recently the Environmental Protection Agency adopted a small refiner definition of 155,000 barrels per day with a maximum of 1,500 employees. The world has changed since 1975 and so has the refining industry. It is, therefore, entirely appropriate to revisit the antiquated 50,000 barrel small refiner standard established in the Code more than 25 years ago. While changing the "on any single day" language to "annual average" would be favorable, raising the threshold from 50,000 barrels per day to 75,000 barrels per day would be better. Raising the limit to 155,000 barrels per day would be better still, and more reflective of small refiner standards, given the nature of today's refining industry.

Having laid out the policy reasons for the changes we are proposing in this area, I am pleased to report that on July 18th the House Ways and Means Committee incorporated our proposal in its energy tax package, H.R. 2511. The Energy Tax Policy Act of 2001 included a provision that changed the "on any single day" language to an "annual average" and raised that average from 50,000 barrels per day to 75,000 barrels per day. For the record, we would also note that this provision has received support from Congress in the past. With the assistance of Congressman Jim McCrery and Senator Breaux, a similar provision was incorporated in the 1999 tax bill, subsequently vetoed by President Clinton. We also are grateful that this initiative has been incorporated into both Senator Murkowski's National Energy Security Act of 2001 (S.389) and Congressman Thornberry's Independent Energy Production Act of 2001 (H.R.805). With this strong bipartisan support it is our hope that the Senate, starting with your Committee, will act favorably on this matter as well.

The EPA Sulfur Reduction Regulations

The EPA has recently issued two new regulations governing the sulfur levels, which will be permitted in transportation fuels. Beginning in 2004 gasoline sulfur levels will have to meet a 30 part per million standard, which is about a tenfold decrease from current levels. In its consideration of this rulemaking the EPA pro-

vided an extended timetable for full compliance by small refiners until 2008 provided that they meet less strict interim standards in the meantime. For purposes of determining which small refiners would qualify for this treatment, the EPA adopted a 155,000 barrels per day capacity and 1,500 employee limit as its small refiner definition.

Subsequently, the EPA enacted a 15 part per million sulfur standard for on-road diesel to take effect in 2006. This standard as compared to the current 500 part per million specification represents a 97% reduction. Unlike the gasoline regulation the new diesel standard has no deferred compliance provision for small refiners. In addition, the industry expects the EPA to issue another new ruling reducing the sulfur limit for off-road diesel in the near future. All small refiners produce diesel fuel and many also produce gasoline. The combined effect of these regulations will close the markets to any small refiner who does not or cannot undertake the installation of expensive desulfurization equipment.

While no one opposes the larger objective of a cleaner environment, the onus of these regulations is falling heavily on the refining industry. The technology to produce these ultra low sulfur fuels exists, but it is not inexpensive. Due to their size and limited capital resources small refiners will be disproportionately affected.

It is impossible to generalize about the specific effects that a typical small refiner will encounter. Each refiner will encounter its own unique challenges depending upon its location, its existing infrastructure, and its marketing strategy. But it is safe to say that few, if any, small refiners will escape the need to make large investments in desulfurization equipment in order to continue in business beyond the effective dates of these regulations.

In some cases these investments may actually exceed the entire market value of the existing refinery. Moreover, if history is any guide, little return can be expected from these particular investments. It is not hard to envision the concerns that are raging through the small refiner contingent about the ability to raise the capital needed for investments which will do little more than allow them to merely stay in business. Many hard decisions lie ahead.

The Blue Island refinery closed this year citing the very same regulatory burdens being addressed herein. In addition, the former Pennzoil refinery in Shreveport, Louisiana was recently sold and ceased production of transportation fuels, devoting its resources instead to lubrication products, which are not affected by the latest EPA sulfur reduction regulations. We believe it inconsistent with the best interests of the nation to allow any more such occurrences if they can be avoided.

When considering the energy needs of the nation, policymakers have not been averse to including the use of tax incentives to spur development, and guide policy. Notable examples include the excise tax exemption on ethanol used in gasoline, tax credits for enhanced oil recovery costs, tax incentives for energy conservation investments and investments in power generation from renewable resources, and even proposed tax credits for the purchase of fuel efficient hybrid or fuel cell automobiles. The present danger of losing a significant portion of the country's refining infrastructure suggests that a similar strategy may be necessary.

An ad-hoc group of small refiners has been working on proposals permitting the use of either tax credits, or expensing of investment, or a combination of the two which would apply to all investments required of small refiners by the new EPA ultra-low sulfur regulations for diesel fuel. Since small refiners will be facing diesel fuel desulfurization expenditures sooner than gasoline desulfurization, the early proposals have focused on diesel fuel. However, similar proposals would be equally applicable to investments required of small refiners to meet the EPA ultra-low sulfur regulations for gasoline. Under these proposals the qualifying refiners would have to meet the EPA small refiner definition of 155,000 barrels maximum capacity and a maximum of 1,500 employees. I urge the Committee to give careful consideration to any bill that develops from these efforts.

The small refiner is an important national resource. Small refiners are eager to contribute to the national good but can only do so much with limited resources. Tax relief in whatever form it finally assumes could be the appropriate prescription for helping small refiners cope with the eminent challenges to their survival being posed by the new EPA gasoline and diesel sulfur reduction regulations.

Thank you very much for affording us this opportunity to present these issues before the Committee.

STATEMENT OF THE SOCIETY OF INDEPENDENCE GASOLINE MARKETERS OF AMERICA

I. INTRODUCTION

The Society of Independent Gasoline Marketers of America ("SIGMA") respectfully submits this statement to the Senate Committee on Finance on the occasion of its hearing on "The Role of Tax Incentives in Energy Policy, Part II." SIGMA appreciates the opportunity to submit this statement and asks that it be made part of the official record of this hearing.

II. THE ASSOCIATION

SIGMA is an association of approximately 260 motor fuels marketers operating in all 50 states. Together, SIGMA members supply over 28,000 motor fuel outlets and sell over 48 billion gallons of gasoline and diesel fuel annually—or approximately 30 percent of all motor fuels sold in the nation last year. SIGMA members do not refine gasoline and diesel fuel—they sell it at wholesale to other retailers and at retail to America's driving public.

III. THE ROLE OF INDEPENDENT MARKETERS IN THE MOTOR FUELS DISTRIBUTION INDUSTRY

Independent petroleum marketers and dealers have long been recognized as the most efficient operators in the gasoline marketing industry. This historic role was emphasized by the U.S. Court of Appeals for the Sixth Circuit in *Marathon Oil Company v. Mobil Corporation*,[1] when it noted that independent marketers and dealers ". . . are the most competitive factor in the industry at the wholesale and retail levels."[2]

Independent marketers of motor fuels have survived in this extremely competitive industry by occupying a strategic niche: they are the most efficient providers of motor fuels to the public. Independent marketers' overhead costs are, as a general rule, significantly lower than the average refiner-operated outlet.

However, the role of the independent marketer in the motor fuels distribution system is predicated on one fundamental condition: plentiful and diverse sources of motor fuels supplies. In the past, independent marketers have been able to rely consistently on numerous independent and integrated refiners and on adequate supplies of imports to assure their sources of supply. However, if sources of supply or numbers of suppliers are restricted, independent marketers must rely on integrated refiners—their strongest competitors—for motor fuels supplies. When integrated refiners are aware that an independent marketer has many other sources of supply, then the integrated refiners are forced to be competitive. When sources of supply narrow, however, there are no such competitive forces acting on the integrated refiners.

SIGMA members have a vital stake in the overall supplies of gasoline and diesel fuel across the nation. When motor fuels supplies are tight or product outages occur, independent gasoline marketers are the first industry participants to experience difficulties obtaining adequate supplies to provide to their customers. In general, independent marketers can be viewed as surrogates for consumers—if supply shortages occur and retail motor fuel prices spike—both independent marketers and consumers will be harmed.

Consequently, SIGMA members approach virtually every public policy issue with a single question: "What impact will this proposed legislation, or regulation, have on overall motor fuels supply?" SIGMA posits that this Committee should ask a similar question as it considers the role of tax incentives in energy policy, particularly as it considers the current state of the domestic refining industry.

IV. THE STATE OF THE DOMESTIC REFINING INDUSTRY

SIGMA firmly believes that our nation is facing a serious energy situation in the motor fuels refining and marketing industry. Dozens of petroleum refineries have closed over the past two decades and new environmental protection mandates, such as low sulfur gasoline and diesel fuel, are likely to exacerbate this trend. Operating inventories of diesel fuel and gasoline are at historically low levels and the nation's refineries are operating at or near maximum capacity. Gasoline and diesel fuel demand is increasing by between one and two percent each year, and yet the number of refineries operating to meet this ever increasing demand is decreasing. In 1990,

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[1] *Marathon Oil Company v. Mobil Corporation*, 669 F.2d 378, (6th Cir. 1981), *cert. denied*, 102 S.Ct. 1490 (1982).

[2] *Id*. at 383.

there were essentially six different types of gasoline being sold nationwide. Now, there are more than 25 different gasoline formulations, all being transported and distributed through the nation's motor fuel infrastructure. The pressure of overlapping federal, state and local regulations has crippled what was previously one of the most efficient commodity distribution systems in the world—the United States' fungible grade motor fuels distribution system.

As the saying goes, there is no free lunch. It should not surprise policy makers that after tens of billions of dollars in environmental compliance costs borne by refiners and marketers, after the complete fragmentation of the motor fuels distribution system, and after the politically-motivated diverse gasoline formulations adopted by various states, there is a price to pay. A price that ultimately must be paid by consumers of gasoline and diesel fuel. As long as the motor fuels refining and distribution system works perfectly, supply and demand stay roughly in balance and retail prices remain relatively stable. However, if a pipeline or refinery goes down, overseas crude oil production is reduced, the weather disrupts smooth product deliveries, or a new regulatory curve ball is thrown at the motor fuels refining and marketing industries, we do not have the flexibility to react and counterbalance these forces.

V. SIGMA'S SUGGESTED PUBLIC POLICY SOLUTION

The public policy solution to the current motor fuels supply crisis will not be simple, but it must be addressed. SIGMA posits that the solution is not the rollback of environmental protections. That proposal is a non-starter and should be discarded. Alternatively, SIGMA this year has encouraged other Senate committees to consider restoring fungibility to the nation's distribution system.

SIGMA encourages the Senate Committee on Finance to consider an effective plan to assist our nation's domestic refining industry to meet the challenges posed by ever more stringent environmental mandates. If more refineries close in the next five years, overall motor fuels supply will be reduced and both independent marketers and consumers will suffer the consequences.

This Committee must arrive at a public policy that assures that our nation's refineries, both large and small, stay in business, expand to meet increases in demand, and produce clean, affordable motor fuels. But this policy cannot be achieved without enlightened government policies and programs. The capital expenditures that refineries must make over the next six years in order to meet new environmental mandates are huge. And many refineries, particularly small, regional refineries, will be unable to justify those expenditures and will cease operation—further straining motor fuels supplies. Already, this year, Premcor announced that it would close its Blue Island refinery rather than undertake the upgrades necessary to make low sulfur gasoline and diesel fuel. Other refineries, owned by both large and small companies, will follow suit in the next few years.

SIGMA urges this Committee to consider tax provisions to assist refiners to make the mandated environmental upgrades. This assistance will be particularly important to small- and medium-size "regional" refineries. Environmental upgrade costs fall more heavily on these smaller refineries because they do not enjoy the economies of scale that some larger refineries possess to make these upgrades. In many cases, these smaller refineries represent the "marginal" gallon of gasoline and diesel fuel in many marketplaces—the gallon that is the difference between adequate supplies and supply shortages.

VI. SIGMA'S SPECIFIC PROPOSAL

SIGMA supports the adoption of tax incentives, such as an environmental upgrade tax credit, to assist companies with small refineries in making mandated environmental upgrades. At a minimum, SIGMA supports such incentives for "small refiners"—companies with 155,000 bpd in refining capacity and 1,500 or fewer employees. In addition, SIGMA suggests that this definition of "small refiner" be clarified to assure that only employees engaged in a company's refining operations are included in the employ count under the definition. It would be an absurd result if a refiner with two 25,000 bpd petroleum refineries that employ 1,000 workers is excluded from taking advantage of these tax incentives simply because the refiner also operates 25 retail gasoline stations that employ 20 workers each. SIGMA posits that the definition of small refiner should be clarified to exclude those employees who are not engaged in the refining portion of the company.

VII. CONCLUSION

SIGMA urges this Committee to take steps to maintain and expand our nation's domestic refining capacity through appropriate tax incentives. Without such incen-

tives, domestic refineries—particularly small, regional refineries—will continue to shutter their doors, refining capacity will be reduced and more concentrated, and both independent marketers and motor fuels consumers will suffer from reduced supplies and increased prices.

Thank you for the opportunity to submit this statement.