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OIL BUBBLE OR NEW REALITY: HOW WILL SKYROCKETING OIL PRICES AFFECT THE U.S. ECONOMY?

HEARING

BEFORE THE

JOINT ECONOMIC COMMITTEE
CONGRESS OF THE UNITED STATES

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OIL BUBBLE OR NEW REALITY: HOW WILL SKYROCKETING OIL PRICES AFFECT THE U.S. ECONOMY?

WEDNESDAY, JUNE 25, 2008

CONGRESS OF THE UNITED STATES,
JOINT ECONOMIC COMMITTEE,
Washington, DC.

The committee met at 9:30 a.m. in room 106 of the Dirksen Senate Office Building, The Honorable Charles E. Schumer, Chairman, presiding.

Senators present: Klobuchar, Brownback, and Bennett.

Representatives present: Maloney, Cummings and Brady.

Staff present: Christina Baumgardner, Heather Boushey, Tamara Fucile, Nan Gibson, Colleen Healy, Aaron Kabaker, Michael Laskawy, Ted Boll, Chris Frenze, Jim Gilroy, Rachel Greszler, Jeff Schlagenhauf and Jeff Wrase.

OPENING STATEMENT OF HON. CHARLES E. SCHUMER, CHAIRMAN, A U.S. SENATOR FROM NEW YORK

Chairman Schumer. The hearing will come to order. I want to thank everybody for being here. I apologize for being a bit late.

Today, we're talking about the skyrocketing price of oil, and we want to explore whether the high price of oil is a bubble or a permanent, painful reality, or some of both; how it will affect our economy and what we can do to reduce prices and break our dependence on foreign oil.

We know that gas prices and the high price of oil and oil products is the number one issue in America. Everywhere we go—Legion halls, parades, weddings—this is one of the very first things that people bring up.

I wouldn't even say "one of the very first things;" this is the very first thing almost everyone brings up. It's no wonder that Congress has held about 40 hearings on oil and energy policy this year, 11 this month alone.

Now, we're all looking to find answers to some pressing and important questions, so we can shape the right economic and energy policies, going forward. I'm hopeful we'll have some luck answering those questions today from our very distinguished panel, including Dr. Dan Yergin, a Pulitzer Prize-winning author of "The Prize," and one of the world's foremost experts on oil and energy.

We eagerly look forward to hearing from him, and from Dr. Frederick Joutz and Skip Laitner, shortly, and I thank all three of you for coming and for going out of your way to be here.

I think that everyone would like to believe that high oil prices are a bubble; that you burst the bubble and the price will come down and stay down. We all hope that's the case, but it may not be so.

Many would like to believe that there's a silver bullet that could pop the bubble, but if there's an oil bubble or prices temporarily decline and we put off doing the necessary things we have to do, like conservation or investing more in alternative fuels incentives, we'll be even further behind than we are now, from breaking our foreign oil dependence.

One thing is clear: Demand is on the rise, especially in rapidly-developing large countries like China and India, and, in this global economy, they can compete for oil that's produced here or overseas as well as anybody else, and the high price wins.

I heard the other day, that there will be as many new cars in the developing world as there are total cars in the U.S. over the next ten to 15 years. In other words, if every Chinese, Indian, Brazilian who never had a car buys one, that will be equal to the number of cars we now drive here.

In fact, the Energy Information Administration is projecting that oil prices will have increased by almost 70 percent from 2007 to 2008, gasoline will have increased by 35 percent, and diesel prices will have increased by 50 percent.

The question everyone asks is, if demand has not gone up by 70 percent, why do prices go up by 70 percent, and that's the question we want to answer here, because that leads to the belief that there is a bubble.

I also think it's interesting that the big oil companies and OPEC are blaming speculators for out-of-control prices, when they may be much more of the cause. They're sort of diverting attention.

It isn't as cut and dry, at least to me. Speculation may be exacerbating the demand problem, but if we guess wrong on the cause, we're going to put off the right solutions.

There are some things that can be done to curtail the impact of speculation, like raising margin requirements and strengthening regulations, and I believe some of these may do some good. I'm for them.

But they may not solve the problem in the long run, particularly if we think these are the only things that should be done. The reality is that we need to look beyond quick fixes that will do little for consumers as they pay record prices at the pump.

Now, we have some charts up here. Many consumers are experiencing stagnant wages, sending a much bigger slice of their paychecks into their gas tanks.

Americans are spending twice as much on gasoline today than they spent in 2001. Across the nation, families are being shaken down for about five percent of their take-home pay, just to pay the gas man.

Here is the chart that shows the percentage of disposable income that a family pays. It's doubled.

[The chart entitled "Americans Are Spending Double on Gasoline Now Than They Spent in 2001" appears in the Submissions for the Record on page 40.]

Low- and middle-income families are particularly hard hit. The recent data from 2006, when gas prices were only $2.50 a gallon, shows that the lowest 20 percent income level, spent ten percent of their paychecks on gasoline, and that's a scary figure for people who are trying to scrape by every day and have to take their cars to work, oftentimes.

For all the talk about how American families have benefitted from the President's tax cuts and for all the emphasis that Senator McCain is placing on making those tax cuts permanent, the simple, undeniable—you can look it up—no-spin truth is that the average American family is paying far more in higher gasoline prices this year, than they received in the Bush tax cuts.

So a lot of Americans are wondering what Washington can do to bring down oil prices and reduce our dependence on oil.

First, let me tell you what Washington didn't do: With seven years under the belt of this Administration, the White House has taken zero proactive steps to reduce our dependence on foreign oil—zero.

If it wasn't for the recent Democratic Congress passing long overdue modest increases in fuel efficiency standards for cars, President Bush would have left the White House with a spotless record, committing no sins against big oil or OPEC.

Now, with almost 70 percent of the oil we consume, going into our gas tanks, it's a crime against our future, that since 1995, so many here in the Congress, and, of course, in the White House, opposed increasing fuel economy standards for so long.

Even now, in the midst of $140 a barrel oil and $4 gasoline prices, the only solution some of my friends on the other side of the aisle are familiar with, is drilling in the Arctic Refuge. By 2018, ten years from now, ANWR might produce enough oil—and this is not my estimate; this is the Department of Energy—to decrease gas prices by one to four cents a gallon in 2018.

The only short-term way to increase supplies right now, leads directly to the sands of Saudi Arabia. As we see here, OPEC is producing well under its capacity, despite record oil prices.

Saudi Arabia is about the only country that has extra capacity right now. It's the 800-pound gorilla of oil production, and even after modestly increasing production this weekend, they still have excess capacity.

Most experts believe they could produce another million barrels of oil, which would have an immediate impact on price. Today, Saudi Arabia is still producing this year, below its 2005 production level, and that's not because of lack of maintenance or wells running dry, as it is in, say, Russia or Venezuela or Mexico.

But, having said that, in the long term, we must address the demand side of the oil equation. That is the only answer, in my judgment.

One good thing that came out of the oil shock in the '70s, was the push for dramatic energy conservation. Jimmy Carter is not regarded as a very successful President, but a lot of the things he did had positive effects on oil prices for a decade or more later.

Why don't we do more of it now? It would reduce prices at the pump and be the easiest thing to accomplish legislatively. And we'll hear about this from Mr. Laitner, but California—people forget

this—California made herculean efforts under Governor Jerry Brown, over 20 years ago, during his Administration, to reduce consumption.

They put into effect all kinds of conservation measures—for buildings, utilities, appliances—and now California, the car capital of the country, is well below the national average in energy use and consumption.

As one environmentalist said, alternative fuels are the sizzle, but conservation is the steak. Even as someone who supported targeted drilling in the East Gulf—I was one of the few Democrats who voted for it. I said, let's drill in the East Gulf. I didn't see much environmental damage, and we should do more drilling in the East Gulf.

That's closest to the refineries; it probably has the greatest known capacity of untapped oil and gas.

You still can't drill your way out of the problem. If you don't do conservation, if you don't do alternative energy, and you don't tell the big oil companies they can no longer run energy policy in America, we won't succeed, plain and simple.

So there are two main things, in my mind, that set our nation way off track on energy prices: First, because there were low prices—and that is good—we were complacent. We didn't prepare for the future as the handwriting was on the wall.

Second is the power of the oil, utility, and car companies, which for years and years and years, prevented us from enacting real alternative energy programs.

So there are a lot of questions. I'm sure that not all of my colleagues will agree with everything or even most of what I've said, but I think we ought to have a debate on this very important issue, and look at the causes, before we look at how we're going to solve the problems.

So, with that, let me call on Congressman Brady for his opening statement.

[The prepared statement of the Honorable Charles E. Schumer follows appears in the Submissions for the Record on page 41.]

OPENING STATEMENT OF HON. KEVIN BRADY, A U.S. REPRESENTATIVE FROM TEXAS

Mr. Brady. Thank you, Mr. Chairman. It's a pleasure to join in welcoming the panel of distinguished witnesses before us today. The topic, not just of current oil prices, but future oil prices and gas prices, is a concern of all Americans, and they want Congress to take action now to address this problem.

Earlier this year, Congress took great pride in announcing and passing legislation providing economic stimulus checks to America, but data released last week, shows that the historic rise in gas prices, has wiped out the economic impact of those stimulus checks.

Average families in America are paying $535 more this year than last, so those $600 rebate checks, economic stimulus checks, are not going to buy a family's computer or new washer and dryer, but is being poured down our gas tanks and having an effect, unfortunately, on our economy.

As witnesses will testify about today, higher oil and gas prices are largely due to the fact that global demand is rising faster than global supply.

In recent years, rapid economic growth in China, India, and elsewhere, have raised living standards, but also resulted in rising demand for oil, gas, and other commodities. Gasoline price controls and subsidies in many countries, have also contributed to demand pressures.

Meanwhile, supply is growing at a much slower pace, and we're not producing as much as we need. Instead, we're relying on unstable countries to fuel America.

For example, recent instability in Nigeria, has led to a drop in production there, and other producers have tightened their supplies, as well. We can no longer afford to rely on unstable countries for our energy needs.

And while Congress is eager to place the blame elsewhere, whether it's OPEC or big oil or big autos, the fact of the matter is, we ought to take a square look in the mirror. We need more American-made energy, and this Congress has resisted it. We need more supply.

Three decades ago, during Jimmy Carter's energy crisis, this country imported just one-third of energy and produced the rest ourselves. Today, it is almost exactly the opposite; we import two-thirds of our energy and take responsibility for only one-third.

Our goal should be to take responsibility for two-thirds once again. It seems to me, reading Dr. Yergin's testimony, where he talks about the either/or phenomenon, this Congress has been eager to offer a false choice to the American public: Either renewable energy or traditional energy.

The truth of the matter is, for us to have both stable energy prices and to transition to a more balanced portfolio, we need both.

This Congress is committed to conservation through fuel standard increases. We've committed to renewable energies by extending the Republican tax credits on wind, solar, hybrids, and a number of other alternative sources.

What we've refused to do, is commit to creating more traditional energy here in America. We must thoughtfully explore the potential of our own resources, open up closed areas to exploration and development.

Beneath America's land and seas, lie an estimated 100 billion barrels of oil and 650 trillion cubic feet of natural gas. Unfortunately, this Congress has failed to act in an effective and meaningful manner to open up those thoughtful resources.

Democrat leaders have offered no solutions, only gimmicks, from suing OPEC to windfall profits taxes, to the latest use-it-or-lose-it approach, which has been universally derided by every geologic scientist in the country.

I hope that we can work together to craft responsible energy solutions that America needs and wants; more American-made energy supply, more renewables, more conservation, so we can again take more control of our own daily energy needs.

With that, I would yield back.

OPENING STATEMENT OF HON. CAROLYN B. MALONEY, VICE CHAIR, A U.S. REPRESENTATIVE FROM NEW YORK

Vice Chair Maloney [presiding]. I'm Congresswoman Maloney, and I, first of all, would like to welcome all of the panelists. We look forward to your testimony, and I would like to thank Chairman Schumer for his very timely and important hearing.

Just a few months ago, it was shocking to see oil rise above $100 a barrel. Now it's trading at record highs above $138 per barrel, double the price it was last year.

Consumers are feeling the pinch in their pocketbooks, and whether it's paying over $4 a gallon at the pump, or seeing higher grocery bills as a result of rising fuel costs, the question on the minds of all Americans, is, are high oil and gas prices here to stay?

Many energy analysts believe that a large part of the recent rise in oil prices, has been caused by increased demand by developing countries such as China and India.

Oil prices are expected to rise alongside the expansion of these countries over the long term. In the short term, the economic downturn here in the United States and the weak dollar, have also contributed to rising oil prices.

The Federal Reserve has lowered its target rate to two percent, which has led to a fall in the Dollar relative to other currencies. Instead of seeking the safe haven of U.S. Treasury Bills, investors have been looking to commodities, including oil, as a hedge against inflation, thereby driving up the prices.

As our witness, Daniel Yergin, puts it, oil has become "the new gold." Financial markets and oil markets have become intertwined as never before, as the amount of non-commercial trading of oil has increased.

Congress must scrutinize how much of the run-up in oil prices is due to speculative manipulation. One potential way to deter speculators from driving up the prices, is in several bills before Congress.

It would prohibit anyone without the ability to actually accept delivery of crude oil, from buying it as a futures contract. There are others for disclosure and increasing the margin requirements.

Americans are paying a hefty price for the Bush Administration's failure to pursue a sensible energy strategy over the past seven years. Meeting the energy needs of our nation, will soon require achieving greater efficiency, conservation, and investing more in renewable fuels.

We cannot drill our way out of this problem, as the Administration would have us believe. The U.S. has less than two percent of the world's oil supply, but we currently use 24 percent.

Drilling in the Arctic National Wildlife Refuge would not yield oil for ten years, and at its peak production in 22 years, it would only save consumers about two cents a gallon on gas.

Oil companies already have 68 million acres of federal oil reserves leased for development, and the House will soon take up legislation, H.R. 6251, that will require oil companies to use those leases or lose them.

We are building on steps that the Democratic-led Congress has already taken to lower oil prices and reduce our dependency on oil,

by expanding tax incentives for renewable energy and creating green jobs to spur American innovation and business investment.

The energy bill signed into law in December, included provisions to combat oil market manipulation and increase vehicle fuel efficiency to 35 miles per gallon in 2020, the first Congressional increase in more than three decades for fuel efficiency.

This Spring, we suspended the Strategic Petroleum Reserve, which will put more oil on the market and help drive down gasoline prices. We have overridden the President's veto of the new Farm Bill, which makes an historic commitment to more affordable, homegrown, American biofuels and increases Commodity Futures Trading Commission authority to detect and prevent manipulation of energy prices.

Congress continues the fight to bring down the price of gas and make America more energy independent. Our nation's continued prosperity depends on meeting the challenge of our energy needs and bringing relief to American families.

Again, Mr. Chairman, we thank you for holding this hearing and we look forward to the testimony.

[The prepared statement of the Honorable Carolyn B. Maloney appears in the Submission for the Record on page 44.]

Chairman Schumer [presiding]. Thank you, Vice Chair Maloney. Senator Brownback.

OPENING STATEMENT OF HON. SAM BROWNBACK, A U.S. SENATOR FROM KANSAS

Senator Brownback. Thank you very much, Mr. Chairman. It's always a pleasure to join you, even if your statements sometimes can be a bit one-sided. I guess that's why we have two sides up here.

I am reminded that on the price-setting equation that I learned in basic economics, that there are two factors that go into price. I don't think they changed this formula much over all the research over all the years. This one seems to be pretty well set.

You have a supply curve and you have a demand curve, and where those intersect at a point called price, and that those are the two pieces to setting the fundamental price. If the panel disagrees with that, I hope, later on, that you'll correct me and correct the economics for the world.

But you have two pieces to this. I think, clearly, what you have to do to work on both sides of the equation. You've got to work on the supply side of the equation and you've got to work on the demand side of the equation, if you're going to be able to try to bring price down. You want less demand, you want more supply, if you are to be able to bring that price point down.

We can work, I guess, against fundamental economics; we can try to jimmy-rig something, but at the end of the day, this is what's going to happen globally.

We've been pretty good, the United States has, on demand side. If you look at our gasoline growth curve, it's been fairly flat, pretty stable. It's gone up a little bit, not a lot.

You look at the world demand for gasoline, and it's skyrocketed. We all know that; we all know that we can control a certain piece

of the demand side of the equation within our own country, or have at least impact on that, but we can't on the world situation.

We also know we can have more impact on our supply here at home and that those two pieces go together. Now, the Democrat response, and they've had one, windfall profits tax, more regulation, no nuclear energy, those go at driving price up. They don't get you more supply in the system.

I guess they could reduce demand by increasing the price, artificially, with more taxes, and that could get at your demand in the U.S. It doesn't get at your global demand point at all, on global prices, because we can't put those taxes on global—people around the world.

That's not going to get the issue there. Nothing done on production. We've certainly done a lot of expansion on ethanol production, on biofuels. I don't know anybody that's opposed to—I guess some people are opposed to expansion of biofuels.

We're certainly looking at cellulosic ethanol. We're getting long, strong support for that. Hopefully, on biodiesel, we'll be able to go forward.

Wind, we're going to be able to go forward. We all support that.

At the end of the day, you still have a gasoline-based system at the present time and into the near future, and you're going to need more oil production and more oil supply. And if you're saying we're going to hold out of production, major tracts that have the highest potential for production, that's going to reduce your overall supply equation in this country.

I want to read a quick quote here that was said by a gentleman I think most people are familiar with. It says: "America must get to work producing more energy. The Republican program for solving economic problems, is based on growth and productivity. Large amounts of oil and natural gas lay beneath our land and off our shores, untouched, because the present Congressional majority—saying that in parentheses—seems to believe that the American people would rather see more regulation, more taxes, and more controls, than more energy. It must not be thwarted by a tiny minority opposed to economic growth, which often finds friendly ears in regulatory agencies for its obstructionist campaigns. Make no mistakes, we will not permit the safety of our people or environmental heritage, to be jeopardized, but we are going to reaffirm that the economic prosperity of our people, is a fundamental part of our environment."

Now, I'd like to take credit for that original thought, but it's paraphrased slightly, spoken 28 years ago by Ronald Reagan when he accepted the nomination to be the Republican nominee for President, when he was nominated that year.

We have got to work on the supply side of this. We've got places we can agree on, a number of these issues, but until you get at that fundamental of supply as my colleague to the right, Senator Bennett noted, when his dad was a Senator, they started talking about the oil shale region in Utah and its availability, and more oil there than in Saudi Arabia, and yet it has been held out of production.

It has not been allowed to be explored. It is past time, and we can do it in an environmentally sensitive fashion. We need to do that; we need more flex-fuel vehicles. We're going to have a bipar-

tisan bill to require that half of our fleet be in vehicles sold that have flex-fuel chips.

But we've got to get at both sides of this equation. We'll work with you on the demand side. We agree on most of that. The supply side is one we cannot ignore; we must address it. Thank you, Mr. Chairman.

[The prepared statement of the Honorable Sam Brownback appears in the Submission for the Record on page 46.]

Chairman Schumer. Senator Klobuchar.

OPENING STATEMENT OF AMY KLOBUCHAR, A U.S. SENATOR FROM MINNESOTA

Senator Klobuchar. Thank you very much, Mr. Chairman. Thank you for holding this hearing, thank you to our witnesses.

I was home this weekend in Minnesota, and probably half the people, when they brought up an issue, it was about gas prices. I think that out on the prairie lands and in the Midwest, where people have longer ways to drive, there's not as much public transportation, it hits people harder.

There are a lot of people not going up to their cabins, not going up to the lakes and other places, just because they simply can't afford to fill their car up with gas.

I would agree with what's been said, that in the long term, that the long-term solution is a combination of things. We are right next door to North Dakota, we know there's some more domestic drilling we can do, but the bottom line, is, we just have three percent of the world's oil reserves and that we're going to have to look for other alternatives.

We're very excited about biofuels in the Midwest. We know we need to go beyond corn ethanol to cellulosic prairie grass, to switchgrass, to LG to whatever else, and we actually believe that this can be done, because we've seen how it's revitalized the rural areas of our state.

But what I'm most curious about today, is this topic of speculation. I think there's a lot of reasons you might have seen this immediate jacking up of prices and this short-term issue.

Some of it, of course, is the demand that we've talked about with China, but the demand in the United States has gone down. Some of it is the weak Dollar, and this idea that I think people have talked about, with people pushing their money into commodities, not just oil, but also food and taking it out of things like hedge funds.

But even all of that, I believe, doesn't really account for this price differential. We had the CEOs of some of the major oil companies testify before Congress a few months ago, and say that oil shouldn't be trading at over $100 a barrel; that it should be trading somewhere around $55 to $60 a barrel.

So the question that I want you to think about, as our witnesses, is, if that's true, do all of these things with just the people pushing their money in and the weak Dollar, account for that vast price differential?

We had a top-ranked energy analyst who called the oil markets, the world's largest gambling hall. It's said it's open 24/7, it's totally

unregulated, and this is like a highway with no cops and no speed limit, and everybody's going 120 miles per hour.

So I'm not one to think this is all about speculation, but when you've seen this frenzy of unregulated market speculation, and you think and you think about these people who are spending their hard-earned money on gas, if you think you can do something about it, that doesn't hurt in the long term, that's going to make some difference in the short term, you want to take action.

And, obviously, the things that we've been looking at, is building on the work that was done in the Farm Bill, which partially closed the Enron loophole, to see if there's more needed to be done with the so-called London loophole, with trying to do something about regulating some of the overseas offshore trading that's being done, to look at what we can do about the margin requirements, which we know are very low for oil, when you compare them to other stocks and things like that; to look at the regulatory powers that we can give to these agencies.

We had a joint Agriculture Appropriations hearing on this with the acting Chairman, and we kept asking, what other tools do you need? Clearly, they need more cops on the beat. There's been a huge reduction in their budget, and in the number of people looking at these markets, but the issue other than that, is, I believe, just looking at this as a former prosecutor, that you want to have the tools.

Maybe you won't use them, but if you've got a situation where you used to have the burden on those that you regulate, and now you have the burden, as the agency, to try to prove things, that's harder to prove them.

So, I think that, looking at what tools we can give to these agencies, to better look at price gauging and better look at market manipulation, is a good thing to do, because any prosecutor will tell you that laws are good, but if you don't have the cops on the beat that are looking for the violations and you don't have the prosecutors to get the work done, it's not really going to make a difference.

So, the way I look at this, it's not all about speculation, but I believe that this has been a major factor in some of the short-term jacking up of prices, and I'd like to hear what the three of you have to say about that, and also about some of the ideas that we've been talking about, to resolve it. Thank you very much.

Chairman Schumer. Thank you, Senator Klobuchar. Our last opening statement, even if new people come in, is going to be Senator Bennett.

OPENING STATEMENT OF ROBERT F. BENNETT, A U.S. SENATOR FROM UTAH

Senator Bennett. Thank you very much, Mr. Chairman. The advantage of going last, is that you get to make notes and respond to some of the things that have been said.

I agree absolutely with your statement when you said that some of us would not agree with you.

[Laughter.]

Senator Bennett. You made reference to ANWR and said it will take ten years, and to quote that great economist, Jay Leno, that's what the Democrats were saying ten years ago when they refused

to agree to open ANWR. The Congress passed authorization for ANWR, President Clinton vetoed it, and if, indeed, we had proceeded at the time Congress passed it, we would now be receiving from ANWR, a million barrels a day.

There's a disconnect between the statement that a million barrels a day, if it were brought onboard by the Saudis right now, would solve a lot of our problems and the statement that if we had drilled in ANWR, we would only have a few cents.

If a million barrels a day from Saudi Arabia would solve our problems, or at least alleviate them, a million barrels a day from ANWR would do it.

And I just want to make this one quick comment: I've been to Alaska, I've seen ANWR. I've also seen the Naval Petroleum Reserve, which is at the top of Alaska.

There's more wildlife in the Petroleum Reserve, than there is in the Wildlife Refuge, and there's more oil in the Wildlife Refuge, than there is in the Petroleum Reserve. It shows that labels—maybe the thing we ought to do, is just switch the labels, so we call the Wildlife Refuge, the Petroleum Reserve and the Petroleum Reserve, the Wildlife Refuge, and then we'd feel better about drilling up there.

There are comments about big oil runs the policy in America. The fact is, we do not have an American oil market, we have a world oil market, and investor-owned companies like ExxonMobil and Chevron, constitute six percent of the world's oil companies. The other 94 percent are controlled by governments.

The largest oil company, of course, is Saudi Arabia; the second one is Iran, then you have Russia, you have Venezuela, and investor-owned oil companies are the only ones who use their profits to prospect for new oil.

The others use their profits, in the case of Hugo Chavez, in order to make trouble in South America. Use it or lose it, with respect to drilling on public lands and leases, I would point out to everyone, coming from a public lands state where the Federal Government owns two-thirds of the state, a lease on public land now expires in ten years and reverts back to the Government, if oil is not found and is not being produced there. Use it or lose it, is the present law.

The reason there are so many leases that are not producing oil, is because the oil isn't there. You get the lease, not by making any seismic tests; you get the lease by looking at it, physically.

Yeah, you're allowed to fly over it with a helicopter, and then you make a bet and say, I think there may be some oil there. You get the lease. That only gives you the privilege of paying rent to the Federal Government on those lands while you explore them.

So, you think there's some oil there, you lease it, you pay rent on it, you do the seismic testing, and if you discover from the seismic testing, that your original guess was wrong, you still pay the rent, and, naturally, you don't produce any oil.

And if you do not produce oil within ten years, you turn the lease back to the Federal Government. Use it or lose it is a strawman, because it's already the law.

Oil shale, it is true that they started talking about oil shale as long ago as when my father was in the Senate. There are several problems with it, some of them technical, most of them financial.

But this Congress has established a moratorium on even filling out the forms that would let you start on oil shale. There is more oil in eastern Utah, western Colorado, and southern Wyoming, than there is in Saudi Arabia, by a very large margin, and 100 percent of that oil shale, is off limits for anyone, under the moratorium currently in place.

There is oil shale activity going on in the State of Utah, and there are test wells—test procedures that look as if they will start producing in fairly significant test amounts this year.

Why is that going forward? Because those test activities are on state lands, rather than federal lands, and the State of Utah is allowing them to go forward. It's time the Federal Government allowed them to go forward, because, repeating again, more oil in Utah, Colorado, and Wyoming, than there is in Saudi Arabia.

Those who say, oh, it's environmentally difficult, because it takes a lot of water, it takes a tiny fraction of the amount of water to produce a barrel of oil from oil shale, as it does to produce a barrel of oil from ethanol.

Chairman Schumer. Thank you, Senator Bennett. I think I'll take the prerogative of the Chair and just mention two quick points, before we get to our witnesses:

One, the difference between Saudi Arabia and Alaska, is that the Saudi Arabian oil is available now and the Alaskan oil won't be available until ten years from now.

We can all go back and say, you didn't do drilling, you didn't do automobile raising of mileage standards. Nobody's blameless here, no matter what your perspective is, and a lot of mistakes were made in the past. What do you do now?

One other point: I despise Chavez and the head of Iran. ExxonMobil, last year, spent 60 percent of its profits buying back its stock. That will not produce one type of new energy, whether it's alternative energy, when the head of ExxonMobil told us he didn't believe in alternative energy, or oil and gas.

With that, I'm using the prerogative of the Chair to get in the last word. I don't do that much, but I couldn't resist it. [Laughter.]

Do you want to say something? You can get the last word, Senator Bennett.

Senator Bennett. Not at all, Mr. Chairman. We can go discuss this privately.

Chairman Schumer. Okay, good.

[Laughter.]

Senator Bennett. We won't take the time of the witnesses.

Chairman Schumer. Thank you. Okay, let me introduce our witnesses. I think this dialogue is a good dialogue, and all I would say, is, I do hope—I don't think the answer is either exclusive demand-side or exclusive supply-side, and I would hope we could come together with some compromise.

Ten years ago, I went to Senator Murkowski and suggested that if he could get ten Republicans to raise the car standards, I could get ten Democrats to vote for Alaskan oil, and it couldn't get done.

Anyway, let me introduce Daniel Yergin. Daniel Yergin is Chairman of Cambridge Energy Research Associates, one of the world's leading energy consulting and research firms.

He's the author of numerous books on energy and economics, including "The Prize," for which he was awarded the Pulitzer Prize. He chaired the U.S. Department of Energy's Task Force on Strategic Energy Research and Development and was the recipient of the United States Energy Award for Lifelong Achievements.

He's a member of the Board of the United States Energy Association; a member of the U.S. National Petroleum Council, and regarded as one of the foremost voices on energy issues.

Frederick Joutz is Professor in the Department of Economics at George Washington University, and Director of Research Programs on Forecasting. Dr. Joutz has served as a consultant and technical expert to several Federal Government agencies and private corporations, including doing extensive work consulting for the Office of Energy Markets and End Use at the U.S. Energy Information Administration.

And Skip Laitner is Director of Economic Analysis for the American Council for an Energy-Efficient Economy. Prior to joining ACEEE, he spent almost ten years as a Senior Economist for Technology Policy for the U.S. Environmental Protection Agency. He's been working in the energy policy arena for more than 35 years.

Gentlemen, your entire statements will be read into the record. Proceed as you wish, and thank all for coming.

STATEMENT OF DR. DANIEL YERGIN, CO-FOUNDER AND CHAIRMAN OF CAMBRIDGE ENERGY RESEARCH ASSOCIATES, WASHINGTON, D.C.

Mr. Yergin. Chairman Schumer, Vice Chair Maloney, Congressman Brady, Ranking Members, distinguished members of the Joint Economic Committee, it's an honor to appear before this Committee, and I certainly want to congratulate the Committee on its wisdom in undertaking and encouraging this searching examination while policies are being considered and before they are being framed.

We are at a break point in world oil. The pressure on markets, the impact on consumers and on the economy, the shifts at hand, tell us that a break point is at hand.

Markets do not go up forever. We're already seeing a response. Gasoline demand in 2007, probably reached its peak in the United States, and is now begun to decline.

Secondly, I think, as Chairman Schumer said, the steak, a big piece of steak, is energy efficiency. It's the subject that drew me into energy research in the first place.

We've doubled our energy efficiency over the last 30 years. I think it's a reasonable goal to double it again. I think it's possible, and I think Skip may address this, that we could reduce our gasoline demand by 700,000 to 900,000 barrels a day, with really no discomfort to consumers at all, by a small package of almost behavioral changes.

The third thing I want to address, is the oil shock, and we really are in an oil shock, and you've already addressed how painful it is for consumers and businesses. The specter of "stagflation" is once

again in front of us with low growth, high inflation. We've discussed how oil prices have gone up.

In such circumstances, the tendency is to try and find a single explanation, but for something this big, there is not a single explanation. I think we can divide it into the traditional fundamentals and the new fundamentals.

The traditional fundamentals have been addressed, particularly the growth in demand. Between 1998 and 2002, world demand grew by four million barrels a day. Over the next five years, it grew by eight million barrels a day. That's the kind of pressure that we have on the demand side.

There's been a slow response in terms of supply. Why?

One is the issue of access around the world; secondly, is uncertainty about investment, fiscal, and regulatory regimes; thirdly—and I'm going to address this—the shortage of people and equipment, is a very big part of the picture.

A second of the traditional fundamentals, is geopolitics. It's already been addressed by Congressman Brady, about Nigeria, as one example. Forty percent of Nigerian production is currently out.

Last week, more oil was lost in Nigeria, than the entire increase from Saudi Arabia, and I could go down a long list of that.

So it's a tight market and it's a crisis-prone market. It's more vulnerable to the impact of disruptions.

I want to add that the dangers and uncertainties related to Iran's nuclear program are also a distinctive feature of today's oil market, and, clearly, there is an Iranian risk factor in the price of oil today.

What about the new fundamentals? The first one is a doubling of costs in the last four years. It costs twice as much to develop a new oil field or gas field, as it did four years ago. There's a shortage of people, equipment, skills, there's the rising cost of commodities like steel, and all of this leads to delay, postponement, cancellation, and so we're seeing a slower response in terms of supply, than would otherwise have been expected.

Then we come to the controversial question of oil as the new gold, and oil as the storehouse of value these days, reflects broad global economic trends and imbalances. Also, it's increasingly seen as an asset class by investors.

This is a development that has only really emerged in the last few years. We know the role of the financial markets is controversial, and no word these days is more controversial than "speculator."

"Speculator" has a technical meaning; it means the people on the other side of the trades of independent gas producers, airlines, or farmers, in hedging their risks.

Then there's the colloquial meaning, which ranges from manipulator to risk-taker, to those who collectively get caught up in irrational exuberance and help generate bubbles.

I think it's too limited to focus on that in terms of the financial markets. They are playing an increasingly important role in price formation, responding to, accentuating, and exaggerating supply and demand, geopolitics, and other trends, and there's clearly the need for greater transparency in these markets, and I think that's

the first step, before new controls, is actually to understand—make sure we understand how these markets work.

What we observe, is that the people who are called financial investors or speculators are in fact in it for many different reasons: Some to trade, some to hedge against inflation, conflict in the Middle East, a permanent shortage, and I think there is a shortage psychology today in the financial markets that's widespread and has grown as the prices have gone up, partly based on current market conditions, and partly based on expectations of what's ahead.

And as we see in other markets, this becomes self-reinforcing, at least until the markets turn.

The U.S. credit crisis, the weakening of the dollar, has been addressed as an important point. As the dollar has weakened, as interest rates have gone down, oil prices and other commodities have gone up.

There's a painful irony here: The crisis that started in the subprime market in the United States has traveled around the world and through the medium of a weaker dollar has come back home to Americans in terms of higher prices at the pump.

Just in terms of policy, one, I think we need—we have to get beyond the "either/or." We need a broad approach, an ecumenical approach, a portfolio strategy that recognizes both the importance of demand side, of alternatives, renewables, and also the reality that over 60 percent of our energy today comes from oil and gas, and that we have to pay attention to the environmentally sound provision of that.

I would say focusing on that question of investment, timely investment, there is a shortfall in investment, and that has to be stepped up in order to play a vigorous game of catch-up with the growing world economy.

The role of markets: I think if we compare the self-inflicted gas lines of the 1970s, with the relatively smooth reaction to the hurricanes in 2005, a very important lesson about how markets can respond, that we should keep in mind.

The members of the Committee have talked about the U.S. and global markets. So often, as I listen to the discussion, it seems to me that we're really rather inward in how we look at it.

Our oil imports are twice what they were in the '70s; our share of the world market is less; the balance is changing the market; national oil companies control over 80 percent of world oil reserves.

The five super-majors account for less than 15 percent of total world oil production. China and India are now significant players. The list goes on.

The realities of the global markets and America's integration into them emphasize the need for a cooperative, multifaceted approach to relations, both with producers and other consumers, and that puts a premium on how we manage, how we think through, and how we structure our relations with other countries.

My last point is about expectations. A lot of what I think is going on in the financial markets, is not only looking at the short term—Nigeria, Iran—but particularly an expectation of short supplies, three, five years down the road.

Those expectations feed back into price, and these general expectations of very tight supplies, are based upon the assumption that

the global market cannot generate the responses that are warranted in terms of demand and efficiency and conservation, in terms of new supplies and timely investment, in terms of renewables, new technologies, and alternatives.

Meanwhile, developments of great importance, like these immense discoveries in the offshore of Brazil or downward shifts in demand that are occurring, these are currently discounted. A major contribution to alleviating today's oil shock would be to create an environment based upon realistic assessments that change expectations.

One way to do that is to ensure that timely investment is really and convincingly underway.

In conclusion, the answer here, as you all have already said, is not "either/or." We need that broad portfolio approach of new supplies, renewables, efficiency, all developed with appropriate environmental and climate change considerations in mind.

Such an approach would be a great contribution, not only to relieving the pain and pressure that the American people are feeling at the pump, and the difficulties that are faced by American businesses, small and large alike, as you all have addressed this morning, it would also be a fundamental contribution to the future prosperity of our nation and to the global economy, of which we are so centrally part. Thank you.

[The prepared statement of Dr. Daniel Yergin appears in the Submissions for the Record on page 49.]

Chairman Schumer. Thank you, Dr. Yergin. Dr. Joutz.

STATEMENT OF DR. FREDERICK JOUTZ, PROFESSOR OF ECONOMICS, GEORGE WASHINGTON UNIVERSITY, WASHINGTON, D.C.

Mr. Joutz. Mr. Chairman, Ranking Member and distinguished members of the Joint Economic Committee, I would like to thank you for holding this hearing and for inviting me to testify on the impact of oil prices on the U.S. Economy.

The impact of rising oil prices on the economy, is an important issue, but one that has only recently gathered the same attention that was paid to it during the oil price shocks of the 1970s.

Although large increases in oil prices, by themselves, do not lead to recessions, large increases in oil prices have been associated with and contributed to episodes of falling incomes, higher unemployment rates, and rising inflation.

What's the likely impact of the recent increase in oil prices? I put together a very simple model, and I estimate that the recent run-up in prices, could lead to a cumulative decline in U.S. GDP growth of six to seven percent over the next two and a half years.

These results are due to the increasing share of incomes spent on oil, and this is consistent with one of the charts you have, showing crude oil's share of GDP has doubled. In fact, it's approaching the levels that it reached in early 1980.

The increase in the share of income spent on oil and the future course of oil prices, affects both consumers and businesses in the United States. It creates uncertainty about income and employment prospects for consumers, and about long-term profits for businesses.

When consumers' confidence is low, as it is today, and they're worried about how much money they are really making or will make in the next few years, they postpone purchases of big-ticket items like durable goods, automobiles, and light trucks.

Businesses make similar plans to postpone or cut their investment, spending decisions, and upgrade their existing machines and structures.

In addition, they are less inclined to hire new workers and maintain the hours of their existing workforce. These changes in spending on the part of consumers and businesses, are the reasons driving the expected decline in GDP.

Further, increases in oil prices, are putting upward pressure on inflation. From 2006 to the present, inflation has risen by about 1.2 percent.

A substantial number of jobs have been lost, as well. Since December of 2007, when employment was slightly over 138 million people, there's been a decline of over 200,000 jobs in the United States, and we've seen that in just the last two months, a big uptick in the unemployment rate.

I would like to contrast the most recent episodes of oil price changes to earlier oil price shocks that the U.S. economy had endured. During the two oil price shocks in the 1970s and early 1980s, GDP fell by 13.3 percent and 11.8 percent, respectively.

At the same time, inflation rose by 4.9 percent and 4 percent, thus the term, "stagflation." In contrast, during the two oil price shocks in the late '90s and early 2000s, there was a much smaller decline in GDP growth, and, in fact, GDP actually increased during the second of those two oil price shocks between 2002 and 2005.

At the same time, inflation increased marginally, while in 2002 through 2005, inflation fell in the United States.

The behavior of the economy during these two recent oil shocks, led many economists to believe that the United States had become immune to changes in oil prices.

However, the evidence and my results, seem to indicate that is not the case. This change in response back to one like we had in the 1970s, of higher oil prices, should not come as a surprise.

First of all, there's been an enormous real price increase, a tripling of oil prices, in a very short period of time.

As I discussed above, the share of income spent on oil and also other energy sources, has risen to much higher levels than what has been seen during the earlier episodes in the 1990s and the beginning of the 2000s.

Second, this oil price increase has followed on and coincided with a severe financial crisis. The Federal Reserve has used expansionary monetary policy to prevent the financial crisis from crippling the economy.

One aspect of that policy, has been a rise in the inflationary expectations.

Finally, I would like to conclude by stating that the effect of oil price changes on the economy, is not symmetric. Even if oil prices fall, while the downward pressure on GDP will ease off, historical evidence suggests that we will not see a corresponding economic boom.

Thank you very much for the opportunity to testify, and I'd be happy to answer questions.

[The prepared statement of Dr. Frederick Joutz appears in the Submission for the Record on page 64.]

[Chart entitled, "Crude Oil's Share of GDP Has Doubled," appears in the Submissions for the Record on page 86.]

Chairman Schumer. Thank you, Dr. Joutz. Mr. Laitner.

STATEMENT OF JOHN "SKIP" LAITNER, DIRECTOR, ECONOMIC ANALYSIS, AMERICAN COUNCIL FOR AN ENERGY-EFFICIENT ECONOMY (ACEEE), WASHINGTON, D.C.

Mr. Laitner. Thank you and good morning, Chairman Schumer, Vice Chair Maloney, distinguished members of the Committee, and Committee staff.

I'm now celebrating almost four decades of work in this thing we call the energy policy arena, and there have certainly been some disappointments along the way.

At the same time, however, I've never been more confident in telling you and this Committee, that the United States has never been better positioned to move on to a path of what we might call sustainable energy production and consumption, one that promotes both productivity and economic prosperity.

The underpinning of this opportunity, is the huge potential for cost-effective investments in energy efficiency through all sectors of the economy.

When we put kilowatt hours of electricity, tons of coal, therms of natural gas, on a comparable footing of oil equivalents, the efficiency potential through the year 2030, is on the order of 45 to 50 billion barrels of oil equivalent, should we choose to develop it and pursue it.

This is about two and a half times bigger than what some have suggested might be available from offshore drilling, and it is about five and a half times bigger than what we will get from the improved CAFE standards enacted by Congress last December.

The good news is that if we were to invoke the spirit of Leonardo da Vinci's motto, saepe videiri, "to know how to see," interpreted, if we know how to see and pursue the development of that 45 to 50 billion barrels of efficiency, that would generate a significant downward pressure on oil prices and increase both the resilience and the robustness of the American economy, again, if we choose to develop it.

As my colleague, Dan Yergin, would perhaps suggest, we might think of energy efficiency as the next great prize.

In all of this, the market responds to direction and information. Policy solutions will play a pivotal role in strengthening the continued development, dissemination, widespread adoption of energy-efficient technologies.

In that regard, ACEEE recommends a set of ten policy actions that might be undertaken by this Congress to immediately provide that market signal, and, more critically, to change the direction of energy usage through increased energy efficiency.

Our proposals include the immediate passage of a joint resolution to reaffirm the energy efficiency resource and directing federal

agencies to develop that resource at all levels within their current budget and mandates.

They also include an emergency supplemental transit appropriation, the creation of what we call a "crusher credit" to retire older and inefficient cars and trucks, and the launch of a national telecommuting videoconferencing initiative to reduce unnecessary travel.

Although Senator McCain appears to have anticipated some of the testimony here today, we should also provide an array of incentives that parallel the automotive X Prize and the Freedom Prize, all designed to stimulate new innovations of energy productivity.

Now, the full set of ten proposals offered here, is intended to accomplish two specific objectives. The first is provide an immediate catalyst, by launching an effort over the next few months, that we think can save oil in a hurry, a small amount, but sufficient to provide some certainty into the marketplace. If undertaken with sufficient robustness, these initial proposals might generate, as already suggested, an immediate downward pressure on oil prices, to the benefits of consumers and businesses.

The second is to begin the process of fundamentally restructuring our transportation infrastructure, a step that will be necessary, if we are to change the energy use path that our transportation system is currently on.

Many of these suggestions lay the groundwork for a shift in the larger transportation policy, an opportunity afforded the next Congress by next year's reauthorization of the Transportation Bill.

And by way of concluding and underscoring the critical importance of the energy efficiency resource, let me share the results of a quick experiment and an analogy. First, the experiment:

I confess I've not done all my homework. I have read Dan's book, "The Prize." I have not yet read the "Commanding Heights." However, I just ordered it, and it's now here in this room, and I did it on my Amazon Kindle. It's an e-book.

I was able to order it and have it accessed here in this room within one minute, and I saved $5 in doing it, so I've now contributed to the royalties of at least one of the panel here.

[Laughter.]

The point is that there are many ways to think about moving and transporting goods. It is, in fact, easier to move and transport electrons than to move and transport people and goods.

We have, through the information communication technologies industry, an amazing capacity to deliver greater efficiency gains, again, should we choose to develop it. That is one example of many that we can rely on and begin to tap, should we choose to see it and choose to develop it.

By way of my analogy, let me draw from the world of baseball. Pitcher Nolan Ryan was something of a hero of mine. He won, I think, something like 324 games over his career, which included a stint with the President's own former team, the Texas Rangers.

But let me ask how many games would the so-called "Ryan Express" have won, had he taken the field without his catcher or without his infield?

In a very similar way, if we are to design and implement an energy policy that sustains our economy in a highly prosperous man-

ner, we should be funding and fielding a complete team effort, and that includes the full development of the energy efficiency resource.

I thank you for the opportunity to speak, and I also will be happy to answer questions.

[The prepared statement of Mr. John "Skip" Laitner appears in the Submissions for the Record on page 87.]

Chairman Schumer. Thank you. I want to thank all three of our witnesses for really excellent testimony that tries to deal with this issue.

We're going to limit questions to five minutes and try to do two rounds, so people can have a second chance.

First, to Dr. Yergin, I was surprised that in your testimony you really emphasized the psychological effect and sort of bad things seem to be prominent and good things seem to be downplayed.

Now, that would sort of not necessarily indicate, but augment the view that non-market forces, non-immediate economic market forces, are having some effect on this price.

You know that the U.S. Energy Information Administration is predicting that while oil prices may remain high in the short term, prices should drop off to the $75 range in the future. Do you agree with that prediction?

A friend of mine says that one thing that will bite in here, is the fact that we're using less gasoline, and, sooner or later, people are going to realize that, and in a huge country like ours, where so much of our oil is gasoline, that that will have an effect.

So, do you agree with the United States Energy Administration's prediction?

Mr. Yergin. We found that the best way to think about—we once did a study called "The Perils of Prophecy," about oil price forecasting, and that so much of what happens to oil prices are affected by other things, such as what happens to GDP, what happens to global politics, and so forth.

I think, though, in our base case, we would think that, as we see the kind of things that have been described here, like greater efficiency, market response, supplies with delay in coming on, that would set the stage for prices to come down from where they are.

I think that right now, I'm really struck by this kind of pessimism about future supply and focus on what's going wrong. I just find that a very important part of the psychology of the markets right now.

I saw your response when I mentioned that other things like the demand response are not getting the attention. When that happens, then I think the markets can change.

Chairman Schumer. And let me then ask you this: Because there is so much talk, the issue du jour here in Congress, is speculation, and if you just sort of stop the speculation, that the price would come down.

That's a little different than what you're saying. You're talking more about markets and the way they function, and, I guess, speculators are a result of that, as opposed to a cause of that, is how some people put it.

So, do you think that if we did some things in speculation, limiting speculation, either raising margin requirements—some talk about that, or at least giving the CFTC power to do that—or saying

that the speculator or the buyer must want the product for some eventual use, as opposed to just holding it as an investment—that's pretty severe, but Senator Lieberman is talking about that—do you think either of those would have—what kind of effect would those have on price, if any?

Mr. Yergin. I think that, obviously, the tool of shifting margin requirements seems to be a reasonable tool that regulators should have, as they do in other markets. Knowledge of what's happening in over-the-counter markets, all of those things, are the starting point.

I think that the notion that you should legislate asset allocation on the part of investors, our 401(k) plans or whoever, you know, whoever it may be, I think that's a pretty slippery slope to get into that. If you limit liquidity, how then does the airline whose back is against the wall—our airlines are spending, I think, $60 billion this year on jet fuel—we know the bad shape they're in.

But if they can't hedge, they would be in even worse shape. So I think that removing the liquidity from the market would not be a wise thing to do.

There are some things that make great sense to do. Senator Klobuchar raised the question that there needs to be trust about the markets, and the first way you'd get that is by transparency and better information.

I think you do that before you rush in and start making a lot of changes.

Chairman Schumer. The proposal that some of us are part of here, that our side of the aisle has put forward, is more information, giving the CFTC the ability to investigate, and then letting them change the margin requirements, without setting a number. That seems to be something that you think might be a positive move.

Mr. Yergin. That's a reasonable thing, and I believe the CFTC is going to report in September on the state of the markets. These markets have changed rapidly, developed rapidly, and the first step is to really more fully understand them.

Chairman Schumer. Thank you. Congressman Brady. We're going to have a second round.

Mr. Brady. Thank you, Mr. Chairman. I appreciate all the testimony today.

I want to focus on Dr. Yergin's comment that global supplies will be in short supply over the next three to five years, that we need to change the expectations, that timely investments need to be confident in the marketplace.

Given that while the Chairman likes to beat ExxonMobil like it were the Brittany Spears of the media, the industry data shows that, as you said, costs are doubling. Most energy companies are reinvesting more than they profit.

The cost of an offshore lease, average cost, is between $20 million and $60 million, the cost of a deepwater lease in the Gulf of Mexico, is between a quarter of a billion dollars and three-quarters of a billion dollars to explore these. The costs are remarkable.

This Congress has said investments in renewable energy are important, even though they may not produce cellulosic ethanol for a decade. Well we may not reach the hydrogen goal for two decades.

Aren't timely investments in the oil and gas on United States lands and offshore, aren't those equally important, timely investments for this country to make?

Mr. Yergin. Thank you. First let me clarify. I was not saying that we necessarily believe that five years from now that markets are going to be very tight, but that is kind of, as you can see, that is what the prices are telling us.

I mean, if we have the kind of slowing of the world economy that has been described, the delay in new supplies coming on, we do not have a crisis involving Iran, then we could see a market five years from now that could look quite different than it looks today. But that is certainly the expectation right now. And there is such a focus in the market on one particular country, China, and the growth of Chinese demand, that that tends I find to often be the end of all arguments and discussions.

Yes, I think that—that is why I said it is not an "either/or" thing, and that as a country over 60 percent of our energy comes from oil and gas, and there are environmentally sound ways of addressing the investment question there, too. That is part of the picture.

For instance, we made a huge bet as a country on natural gas for electric power. We are going to be using a lot more natural gas and electric power. Are we going to import that natural gas from other countries?

We are spending almost $600 billion now to import oil from around the world. Or are we going to produce some part of that extra gas that we are going to use? I think that is a very immediate question we face as a country.

Mr. Brady. Thank you. I think it is important to understand that when looking at both renewables, which we need to do more of, but are very long term and traditional energy which is a proven source, and we know we can produce again, though it will take some time, I think is equally important.

Let me ask the panel——

Mr. Yergin. Could I just add one thing?

Mr. Brady. Yes.

Mr. Yergin. That is, we focus on oil. But as the carbon regime comes into place into this country there is going to be an extra premium on natural gas.

Mr. Brady. Sure.

Mr. Yergin. So we really have to think about our natural gas supplies, as well as our oil supplies.

Mr. Brady. Absolutely. Thank you.

For the panel, there is a new proposal called "Use It Or Lose It" where the premise is there's 68 million acres in America that is currently for lease, and there is a vast resource of oil and gas underneath it, but energy companies just refuse to drill it.

Not withstanding the fact that the independent American Association of Petroleum Geologists basically just dismiss the whole premise here in a letter this week in the fact that independents drill, explore the balance of I think 70 percent of the natural gas, more than two-thirds of the oil here in America.

With your expertise as a panel, of those 68 million acres can you identify any of those acres that have vast resources, and that an oil company refuses to explore?

Mr. Yergin. You know there's a famous U.S. wildcatter at the end of the 19th Century who discovered the biggest oil field in Texas, and somebody once said to him: Is there oil at such-and-such a place where he was drilling?

And his answer was: Well, actually only Dr. Drill knows for sure.

We have had an immense advance in technology over the last 10 or 20 years in terms of identifying resources, but still the reason it is called "exploration" is because you do not know.

And of course companies go out with different viewpoints. They read the geology differently. And then they have to prioritize in terms of where do you put your money. And as I think you suggested, you can drill an exploration well in the Gulf of Mexico that could be $120 million and it could turn out you are wrong.

So I think it is a question of people taking that acreage—Senator Bennett described how the process works—and then you prioritize, and of course you go after your best prospects first.

You also have to deal with the fact that your costs are four times—or twice what they were four years ago as you try and figure out what to do.

Mr. Brady. Right. Thank you. Any other comments?

Mr. Laitner. Yes, if I might offer one comment, I think it is an interesting question but we need to take one step back and look at the entire energy market, the production system, at all points in the production process.

We are flat-out 24/7 in something akin to an energy straitjacket. We can't get the right number of trained workers on the rigs. We can't find the right kind of quality piping any longer. We can't find the right number of railroad locomotives to haul coal in a timely way. We can't get tires out to excavation equipment to mine the coal. Even renewables and combined heat and power technologies are 18 months on back order. At every point in the production process the system is constrained.

Even if we drill more oil, there's no guarantee we're going to be able to deliver it, and refine it, and make it available in a timely way.

I talked to some of my colleagues in the oil industry and they told me, flat out, they are a little bit worried about their ability to even deliver oil should they be able to produce it. You can only push it through the pipeline 6 miles an hour, and not much faster. So if the demand goes up, we are in trouble.

The point I am saying is there is a great need for an investment in this Nation's energy infrastructure. If we are going to have to spend a good bit of money anyway, we should step back and think what we can do to provide that slack in the market, and that slack I think includes the need to stimulate oil saving in a hurry and greater efficiency to provide the slack that the market can then readjust and the prices can similarly readjust.

Mr. Brady. At some point I hope we will move away from the gimmicks and move toward what I think is the balanced portfolio approach all of you are proposing today. Thank you, Mr. Chairman.

Chairman Schumer. Senator Klobuchar.

Senator Klobuchar. Thank you very much, Mr. Chairman.

Mr. Laitner, I was captivated by your testimony about the positive position we could be in if we made some good policy decisions in terms of energy efficiency.

I will say I think the country, the people itself, have moved on beyond Jimmy Carter getting on with the sweater and looking glum on TV. I just see a real interest in this issue in our State, because I see it beyond an environmental issue; that it is a way for them to save money if we give them the tools so that they can make those decisions, whether it is the types of cars or trucks that they purchase, if they have more of a choice so they can make that decision, or a little technology that they can put on their washer and dryer to figure out when to run it.

I always think back to when Kennedy said he wanted to put a man on the Moon. It was a question of resources, but it was also leadership. And out of that leadership came everything from the CAT scan, to infrared technology, to those little chocolate space sticks that my family would take on camping trips in the 1970s.

I was reading your testimony where you talked about even these GPS monitors, how you could use the technology so people would know how to avoid congested routes, which I thought was fun as I love going with those GPS monitors and having my husband be told "take a U-turn, take a U-turn, you've gone the wrong way."

[Laughter.]

Senator Klobuchar. But anyway, I think that there are all kinds of possibilities here. My question is: Do you agree that if we could take some of these—you know, we have limited budgets here, and a lot of us wanted to take some of these oil giveaways, the $17 billion to Exxon and these other companies—by the way, Congressman, I don't think that Britney Spears got $17 billion—but to take these investments in these resources and put them into what you're talking about, into the hybrids, and the electric cars, and the investment, that we could move this change quicker?

Mr. Laitner. Yes, Senator Klobuchar, a good question. I absolutely agree.

Let me give you one of many examples—I could go on. Not too long ago I took a trip to Stockholm, Sweden, but I did that by walking two blocks down from my office here in Washington, D.C.

I had an absolutely fabulous meeting. It was a form of video conferencing. And in your profession you may recall that now increasingly they are taking affidavits and witness testimony long distance by video conferencing.

This happened to be a legal firm earning secondary income by allowing video conferencing. We had absolutely quality image, quality sound, and I saved I estimated something like 3700 pounds of carbon dioxide emissions that I did not use because I was doing air travel to Stockholm, Sweden.

One of the initiatives we are calling for is a greater understanding of both telecommunication, or teleworking, telecommuting, video conferencing, which can lay the foundation for I think some substantial energy savings in the short term, to be sure.

But more generally, if we take a step back and understand the levels of efficiency, we are still no more efficient in terms of our electricity production than we were in 1960.

Now imagine, had Intel introduced its micro chip in 1971 and stayed at that same level of transistors per chip where we would be as an economy. We have some huge opportunities at all points in the production process, the refinement process, and the use process to encourage efficiency, if we will take a step back.

But I think your point is critical in that leadership is absolutely required, which is why we tried to frame our ten proposals addressing the transportation perspective initially in a step-by-step sequence so that we can inspire confidence in the market.

If we first announce what we are going to do, and then we reinforce that by taking actions, I think that will do a lot to stimulate and inspire the confidence that will reduce the tendency to the price levels we're seeing today.

Senator Klobuchar. Thank you. Dr. Yergin, now you talked about the demand going down. Did you mean worldwide, or just in our country, for oil?

Mr. Yergin. I was just talking about U.S. gasoline demand. Also you're seeing it in Europe. Obviously if you look at China, if you look at India, they are on a very different curve in terms of their demand.

Senator Klobuchar. How about worldwide demand, then? Is that going up?

Mr. Yergin. Worldwide demand was growing at about a million-and-a-half barrels a day. We think this year it will grow by about 900,000 barrels a day. So the rate of growth is slowing, and that is significant, and that is of course a response to price.

Senator Klobuchar. And so, still going back—so the rate of growth is slowing, but this year is the year we see the gas prices going up 30-some percent, and the diesel prices up 66 percent, crude oil up 98 percent.

How much do you think that this migration of investment—I won't use the word "speculation"—the migration of investment from subprimes and other things into this market has affected things?

Mr. Yergin. Well I think it is very hard to quantify. I think it is part of it, and we particularly saw it if you start looking back at July when the subprime crisis began. You certainly start to see in oil and other commodities those prices going up substantially telling you there's a shift in investment.

So is it $20? Is it $30 of the price that reflects the impact of the investment market and the kind of growing pessimism?

You see the Iranians make a statement, a bellicose statement, and you see the price of oil go up $5 or $7, and they made an extra $85 million that week, too.

Senator Klobuchar. Do you think those statements, when they make the statements, but do you think that investors sort of use that as an excuse to then jack up the prices?

Mr. Yergin. It's people get nervous, and it's not only investors but it may also be people, airlines or others, who have to worry about supplies hedging it.

So I think it is kind of a reinforcing process. I think if we saw demand—but the other side of it is, supply is also growing rather slowly this year. So the two things are coming together in this pessimism.

At some point these other factors of demand, the kind of things that Skip is talking about and that have been described by Dr. Joutz in terms of the economy, those are the factors that have not yet been factored into the market, but that is when the market will have its top in turn.

Senator Klobuchar. So part of this would be just—I do not want to paraphrase what you're saying—but you believe in using a cautious approach with speculation in terms of getting transparency and giving the agencies the tools, and acknowledging that this might be part of the short-term problem?

Mr. Yergin. Yes.

Senator Klobuchar. But the longer term of doing some of the things he is talking about could actually affect the price, because people will see that we are going another route?

Mr. Yergin. Yes. I'll tell you, I think something—it is not in the power of this Congress—but if there was a way to do something about the Nigerian Delta region, that would be a real contribution to helping reduce the prices that Americans are paying at the pump.

In the new book that I am writing—Skip called it the "Next Great Prize"—the new book, I was going to write one chapter on energy efficiency. I ended up writing three chapters because there is so much going on, and as he suggests in his testimony we have so many tools today that we just did not have even 5, or 10, or 15 years ago.

What I see in this country, I can remember when energy efficiency was in that "either/or" category. Now what I can see is it is something that everybody across the spectrum says this can make a major contribution, and this is a major element in the solution.

Senator Klobuchar. Thank you very much.

Chairman Schumer. Thank you, Senator Klobuchar. Just to underscore, the proposal that we have, our Caucus, on speculation, which is CFTC looking at the facts and maybe changing the margin requirement without setting one, is right consonant with what Dr. Yergin has said.

There are other proposals that go beyond that.

Senator Bennett.

Senator Bennett. Thank you very much, Mr. Chairman, and thank you all on the panel. This has been very illuminating and very helpful.

Dr. Yergin, you have been helpful to this Committee over the years and it is good to see you again. Let me focus, because I think you have put your finger on it, on the issue of expectations.

I have learned the one thing the market hates more than anything else is uncertainty. Whenever there is a sense of uncertainty, the price of whatever it is the market is trading in will go up, or down.

If there is uncertainty about a company, the stock will fall even below legitimate projections of what the company will really do, but if there is uncertainty that they will be able to meet those goals the price will fall.

And here there is uncertainty that the efficiency will kick in, that the supply will be there—whether it is oil shale, or whatever

it is that we have been talking about—the Nigerians? Oh, there's uncertainty. The Iranians? There's uncertainty. And we flee from uncertainty, and in this case the price goes up.

So as I look at it, I say what can we do to increase the sense of certainty that in the three- to five-year period that Dr. Joutz is talking about, or two- to three-year period even, that we are on the way toward solution.

You talk about Brazil being discounted, and Iran being exaggerated, if I can put words in your mouth, you put those two together, here's a major new find and people are discounting it, and here is an existing producer that has a crazy president and everybody is going nuts over the consequences of that.

If we could reverse that and say: Well, Iran is going to have another election. Iran is going to do something a little bit more stable. And Brazil is going to really come on. That could have a significant impact simply because it changes the expectations. But in the framework I have created here, creates a sense of certainty.

So that is a different kind of approach than, gee, let's change the CAFE standards, or let's build more natural gas ports so we can bring in more liquid—a comprehensive approach to this whole thing.

Now, Mr. Laitner, I resonate completely with what you are saying about the lack of people and facilities. We have oil piling up in Utah because we do not have the refinery capacity to bring it on line. And most of the refinery in Utah is dedicated to refine Canadian oil that's coming out of tar sands, and the tar sands are closely related to the shale oil thing that I'm talking about because the technology is somewhat similar.

React to that. And give me your thoughts about what immediate things we could do to create a greater sense of certainty with respect to the future that might help calm down the markets.

Mr. Yergin. In my testimony I mentioned one thing that the U.S. Government did during the 1990s which did not get a lot of attention but was very important. That was the support it gave to the Baku-Tbilisi-Ceyhan Pipeline from Azerbaijan to Turkey.

Without U.S. Government support and involvement, that would not have happened. That is now putting 700,000 barrels a day into the Mediterranean, a major contribution to energy security, and in a sense the U.S. Government gave support, a sense of certainty to it, and this very uncertain thing happened.

Now that does not happen overnight, but that is an example of where on an international stage we played a very important role.

Indeed is there a role that the U.S. can play with other countries to help stabilize the Delta in Nigeria? That could be very important. So I think our diplomacy is actually part of our energy policy in a way that they do not normally get connected.

To go back to the relationship with Brazil, it takes on an increasing importance from an energy dimension. What we heard in the last week or ten days about Iran, the reason that has such an impact is it is not only of course about Iran but there is that chronic question that 40 percent of the world's traded oil flows through the Strait of Hormuz, and whenever tension gets high there is a focus on that.

As I was writing this testimony and thinking about the issues about speculation and the financial markets, this issue of expectations, as you suggest, really came to loom very high.

Stability in the investment environment, whether you are talking about oil and gas, whether you are talking about wind, whether you are talking about—across the range, if you have uncertainty it not only affects prices, it affects investment and the path of investment.

I think a couple of other things to focus in on:

One is focusing on this kind of question that Skip described and I talked about, the shortages of people and equipment, we have to grapple with that. There is an educational issue about assuring the next generations of expertise.

So I wanted to highlight what will change the expectations, including if people start to become more confident about what is happening in education. I have to say, though, Dr. Juntz's comments about the economy—I do not think we have heard it expressed as clearly as he has what the risks are to our economy. That highlights the need to address the issues you are talking about in terms of creating a stable environment expectations, not changing the rules, because that is what is going to make things happen sooner rather than later.

Senator Bennett. Thank you, very much.

Chairman Schumer. Okay, we will go to a second round here. This is for all three panelists, but particularly Mr. Laitner first.

There is no silver bullet, but if there is one cost-efficient way to deal with this that we have not dealt with since the 1970s it is efficiency, in my judgment. I think it is the easiest, and it has the greatest bang for the buck.

I mentioned in my testimony the success California has. People do not realize that if you took away cars, California's efficient per-capita use of energy would be similar to many countries in Europe. And even with cars they are more efficient than most states.

Why is it that efficiency, which should not create the kind of political hackles that some of the other things do, why has it gotten so little attention, play, in the United States thus far? And I would ask Mr. Laitner, and then the two other panelists to comment briefly.

Mr. Laitner. Chairman Schumer, that is an excellent question. We just put out a report last month on what we term "The invisible efficiency investment boom."

Since 1970 we have in effect doubled our efficiency over time in ways that have been responding to smart investment, but it is the efficiency we do not see as we use our goods and services.

In other words, efficiency is the energy we do not use in providing travel, or providing entertainment, or food on the table. And because of that hidden nature, that secondary attribute, it is not something that jumps out that you can count and you can reliably turn to for immediate impact on the market.

So the critical need is to make that efficiency much more visible.

Chairman Schumer. Has efficiency slowed? I mean, we know that there was a dramatic increase in efficiency after the oil shocks of the late 1970s. Has our, if you will, rate of efficiency slowed down?

Mr. Laitner. Yes. Let me just give you a quick sense of the history.

Up till 1973 we were very anemic in our ability to improve efficiency. But as you suggest, 1973 to 1986 we improved our efficiency better than about 2.6 percent a year as an economy.

Then it flattened out, less than 1 percent a year over the next decade. Then something interesting happened. One of the new fundamentals that Dan is talking about I think has to do with broadband information communication technologies.

In 1995 Moore's Law began to have an economic consequence. We began to see that in the rapid drop in prices for semiconductors, in computers, even in software. That led to what we are now seeing as the Internet economy in various ways. It led to my ability to download Dan's book through Amazon-Kindle. I did not have to travel anywhere. It is not in paper at all. It is a dematerialized thing, easily available. I saved money doing it.

That is among the things that are contributing to the new tools that Dan was talking about. So that we did see a process of capital deepening in the United States up to about the year 2000–2002 that led to an uptake in efficiency again. But now more recently, beginning with the uncertainties in the market and what we are here today feeling very seriously, that process has slowed.

So we are no longer investing quite like we are even in the computer industry. There is hesitation to make those investments in that smart technology. The capacity is there if the will is there. And if we had that leadership, I think it can again return.

Chairman Schumer. Right. And that is market forces working in technology, which generally are efficiency-producing things, but here in the government if we were to adopt the standards that California did on a national basis—buildings, appliances, utilities—that would have a dramatic effect, I would assume?

Mr. Laitner. That would have a dramatic effect, and that is one of the reasons we laid out the 10 policies we have recommended to be taken a look at. And that would include exactly that point.

Chairman Schumer. Yes. I have tried in the energy bills to get us to do that, and just nobody even cares about it very much.

And, Dr. Yergin, I would make a point here and hear what you have to say, it may have something to do with just the psychological effects you are talking about. People are not paying attention to efficiency, even though it is happening, and even though it could happen relatively easily, and they pay attention to ANWR where there is huge contention and that it is unlikely to happen.

Do you think a greater focus on what efficiency can do, just that in itself might help a little bit?

Mr. Yergin. Yes. It is something I have thought about for a long time. As Skip was talking, as you were asking the question, I was thinking: If we wanted to put out a book about energy, we could have a dramatic photograph of windmills, and offshore platforms——

Chairman Schumer. Right.

Mr. Yergin [continuing]. A power plant, but how do you put a photograph of energy efficiency on the cover?

Chairman Schumer. Yes.

Mr. Yergin. It is, as you said it is the invisible one, and yet when you look at how much we have saved as a country compared to where we were in the 1970s, you see this is an immense resource.

So you say: How do you get there?

Well it is the advance of technology itself. You get it through regulation, information, exhortation, price, tax; all of those things do it.

You know in 1998 was the lowest gasoline price we had ever had in the history of our country, and that of course is a time when you had the great SUV boom because it didn't make sense to worry about gasoline prices.

Chairman Schumer. Right.

Mr. Yergin. Now you see how quickly everybody is playing kind of catch-up with this new regime of prices. So I think it really needs kind of a multi-faceted approach to keep it front and center.

It seems to me that it has—I don't know if you find it in your discussions on the Hill; do you find greater resonance now than say two years ago on this subject?

Chairman Schumer. Some, but not enough to get us moving here. I mean, one of the things I was thinking of talking about was, well, I am not wild about this offshore drilling, but at least if you are going to try to do that you ought to do it combined with some demand reduction and serious efficiency.

As I said, ten years ago I proposed—my friend Senator Bennett is gone, but I mean some of us are trying to be two-sided on this, demand and supply. Now how much of demand should be fossil fuels, and how much demand should be alternatives we can debate, but even putting that aside as I said I proposed to Senator Murkowski, get me 10 votes for automobile efficiency and I think I could get you 10 votes for Alaska. In those days Alaska was less contentious.

And I talked to some of the environmental groups and not all but some of them said, you know, I would hold my nose but if you could do that, or not do that, I would rather do it.

So I think, you know, we do have to come up with sort of the grand compromise here where Democrats sort of hold their nose a little bit and figure out ways to increase supply. As I mentioned, I supported—there was a handful of Democrats supporting drilling in the East Gulf, and Republicans do far more, even though they may think it's not just the market, to encourage efficiency, and we might have the work of a grand compromise.

Frankly, I do not think this Administration can pull it off. It is too late, and they have not shown it, but either President Obama or President McCain might be able to do that.

Mr. Yergin. Well I think that grand compromise is what our $14 trillion economy requires to assure that it has the proper energy foundation for the future.

Chairman Schumer. Right. Let me, since we are in the second round, I will go a little—my time is up, but I will go a little longer with Congressman Brady's permission—Dr. Joutz, tell us about the dollar and the fall of the dollar and how much effect that has had on our increased oil prices?

And again I would be happy to have either Dr. Yergin—well, Dr. Yergin in particular; it is not Mr. Laitner's area of expertise—comment on that.

Mr. Joutz. First, I think one thing that is important to mention is that the world oil market uses the U.S. dollar as its benchmark price. And as the dollar moves, that affects their revenues, and it affects their revenues for also importing goods from the United States and other countries.

When the value of the dollar is appreciating, their real revenues increase and their real imports increase. However, when the dollar depreciates, as it has been doing since about 2002, we have had on a trade-weighted basis about a 20 to 25 percent decline in the value of the dollar.

That means two things. First, the revenues that oil exporting countries have received purchased less than they did before.

On the other side of the coin, the one that is more important to us from the American consumers and firms standpoint, as the dollar has depreciated and the price of a barrel of oil has increased, we've been paying the full price effect of these much higher oil prices.

So when it has risen from $25 to $30 a barrel in the mid-1990s to $40, and today $138, or $135, we are paying the full freight on that. And part of that is due to the value of the dollar declining against other currencies.

Now——

Chairman Schumer. If you had to put a percentage—I know that is hard to do——

Mr. Joutz. I think it is about, I want to say about 25 percent.

Chairman Schumer. Of the increase?

Mr. Joutz. Overall, I think I could say——

Chairman Schumer. Pretty significant.

Mr. Joutz. It is pretty significant. But there is another sort of double-edged sword here.

As the value of the dollar has decreased, yes, we have been paying more for oil. As Dan mentioned, I think this year it is going to be about $600 billion of importing oil. As the value of the dollar has decreased, U.S. manufacturing firms, U.S. service companies, have become much more competitive around the globe.

And what we have seen over the last two to three years is we have seen the export sector in the United States has been rising. And American firms that previously were competing against foreign firms are now more competitive domestically.

So the movements in the dollar make some of us better off, and in other ways worse off.

Chairman Schumer. Do you have anything to say on that, Dr.Yergin?

Mr. Yergin. Yes. In the testimony I cite the Dallas Federal Reserve which attributes between 2003 and 2007 about a third of the price, increase in the rise in the price of oil, to the dollar's decline. And we think that if you start looking from July 2007 you certainly see with the dollar and other commodities they start to go up as the dollar goes down. In other words, this is part of the global impact of the credit crisis.

At the same time, you know just this week we saw in terms of stagflation the doubling that the Chinese are going to pay for iron ore prices which tells you that the demand for all commodities prices are high. And although we focus on the downturn here, everywhere else you go in the world there is this preoccupation with inflation.

Chairman Schumer. Right. One other—this is a question for Dr. Yergin. So you look for—everyone demands a short-term solution. You know, let's snap our fingers and get something done. Very hard. Very hard to do. Maybe the best one is the one you mentioned, sort of a psychological talking up the good side, and talking down the bad side a little bit.

But it seems to me something I have thought, the one place where there is a more ready supply is the Saudis. They have increased supply a couple of hundred thousand barrels, I think 300,000 and then 200,000, but they still have by most estimates I would guess a million more barrels a day that they could produce.

Is there anything that would induce them to do so? Is there anything we can do to get them to do so? Or do you feel that it will not make a difference, or they just will not do it?

Mr. Yergin. Part of the issue is the quality of the oil that they have available is not the one that there is a demand for. There isn't a physical shortage.

That would also leave the world with zero—let's say they produced it all. It would leave us with zero spare capacity, which would be a very precarious position in terms of any kind of a crisis.

The other thing that I focus on—and this is in Skip's area—I really do think that we could very quickly, without influencing any of our standards of living, bring down our gasoline consumption by 6-, 7-, 800,000 barrels a day, with some very minor changes in our behavior.

This is always put over there under that category called "tips," but if you say it is not "tips" it is a strategy. So I actually see conservation as part of our strategic resources——

Chairman Schumer. The kinds of things Mr. Laitner laid out in his ten points.

Mr. Yergin. Yes. And it is just, you know, it bugs me that they are always regarded as just "tips" when you can put them together, and that can have an impact. Because changes in demand can help change the outlook.

Chairman Schumer. Congressman Brady is being very kind. I had a few other questions I wanted to touch on.

The oil workers that you mentioned, that we have a shortage of just people and equipment, classic market economics would say that is going to solve itself rather soon because there is a greater demand for oil, and it has not happened yet.

Could you please tell us a little about what you think of why it has happened? And will it solve itself? And is there anything we can do about it?

Mr. Yergin. Yes. What happened is that you had a 20-year contraction in the oil and gas industry. You had two price collapses, two episodes of $10 a barrel.

So just as the industry finishes its contraction and downsizing, that is when demand explodes with China and India and so forth, and that is why we are playing a game of catch up.

Petroleum engineering departments closed down. People stopped enrolling. So I do think that will fix. But it will not fix overnight because it takes 5, 10 years to get an engineer up to appropriate standards and experience.

You need a—but, you know, four years ago you could have rented a deep-water drill skip for $125,000 a day. Today it would cost you $650,000 a day. Those ships are going to get built, but there again it does not happen overnight. But I think it will—those incentives three, four years from now will see an industry that will be more equipped to meet the needs.

It will be a much more internationalized industry. We will see more Chinese and Indian engineers.

Chairman Schumer. Anything we can do to hasten that?

Mr. Yergin. I would like to give that a little thought. I think on the educational side that might specifically look at the education of energy technologists and would be something that would be well worth—that would be one thing well worth examining.

Chairman Schumer. Well thank you.

Congressman Brady has been very patient as I have gone over my time by a significant amount.

Mr. Brady. No, this is an important topic. And besides, you have the gavel so I think that works well that way.

[Laughter.]

Mr. Brady. I agree, coming from an energy producing state, we do have a shortage of energy workers today, and an aging energy working population. It is a real concern today. In Southeast Texas we have three major expansions of refineries desperately seeking about 15,000 workers both to construct and ultimately to maintain those refineries, and it is an issue.

Energy efficiency. I am pleased that we are talking about this. America is making progress on energy efficiency. The Ways and Means Committee held a hearing, oh, 24 months ago where we basically sat through three days and listened to testimony that shows that we could make virtually everything we touch each day at home or at work more energy efficient. There are remarkable potentials there. And to accelerate that really is the key.

I think part of the challenge is to recognize in rural communities like 10 of my counties where people are forced to drive a long way to work. They are forced to drive a long way to the hospital. They are forced to drive a long way to school. They are making cutbacks and changes in their behavior today, but it is simply not enough to offset the dramatic increase in energy.

I think that may be why the recent Bloomberg poll from yesterday showed that while the American public supports more energy efficiency and supports investments in renewables, that 68 percent of Americans believe we ought to be exploring more here in America.

In fact, 60 percent of Democrats in the country believe we should be exploring more here in the United States. And it has been frustrating I think that we have not had, or been allowed to vote even

once on any bill that would create more production and supply here in America.

So, Senator, I and others would welcome any potential grand compromise on efficiency and production, because I think it is long overdue.

Let me ask you this: One of the frustrations—one of the reasons I think we have trouble with drilling in our deep ocean exploration is that Congress has allowed former Presidents and current Presidents with ratification in Congress has allowed states to basically lock off federal waters off their shores.

I understand that states ought to have control over the three miles of state waters, but beyond that those are federal waters, resources that are owned by the American public, and I think should be reclaimed for the American public as we have this debate about a national energy policy.

We can't have a national energy policy if states control the resources that in fact the U.S. owns.

My question to the panel is: As we go about looking at making timely investments, not just in renewables but in traditional energy as well, is there a reason why the national—why Congress should not reclaim authority over federal waters throughout this country?

[Pause.]

Mr. Brady. Don't all talk at once on this one.

Mr. Laitner. I might open a few comments with the note that the states indeed are in many ways responding much more agilely than the Federal Government at this point with regard to a number of different energy initiatives.

Certainly California is leading the way. New York is doing some really——

Mr. Brady. On the production side?

Mr. Laitner. Well even on the production side. For example I am thinking of more efficient supply like combined heat and power technologies, or waste energy type generation technologies.

Mr. Brady. But as it relates to oil and gas?

Mr. Laitner. That I agree, there is a stasis there.

So the point being that the states are eager to do something——

Mr. Brady. Sure.

Mr. Laitner [continuing]. And they need to be let loose. At the same time, the issues are so paramount that we as a Nation are risking more by not acting at all; that it may be time to rethink what it might require to both develop new sources and to promote efficiencies.

So I would be put in the category of what Chairman Schumer had called "the nose-holder." I can imagine that not acting is going to cost us more environmentally and cost us more financially than coming together with some form of compromise that might allow some offshore drilling to occur.

Mr. Brady. Well we have, for example, off Florida, 100 miles off Florida, on the tiny sliver of Section 181 that we are allowed to explore, and we have a small 2-acre platform there, the independents have, a $2 billion investment, that produces 10 percent of all the natural gas in the Gulf, 2 percent of all the natural gas in America.

You can barely find it. If you and I flew over it for a week, it is so small and environmentally well planned out, it just seems to me some proposals say let's extend state waters even farther out and give states more control perhaps to 12 miles or beyond, but then you can't even see an oil rig 6 miles from a coast. The curvature of the earth doesn't allow it.

But the point being, perhaps the compromise is to extend those waters under state control farther out so there is that reassurance for states, but then to reclaim beyond that and find some thoughtful ways that we can lease what are tremendous resources for us, and which can be done a very environmentally friendly way.

Mr. Laitner. I think we are in such a straitjacket that we need to put all resources on the table, but make sure that they are all evaluated at the same level of analysis in terms of full costs and full benefits, and then make some decisions about what is the mix of resource that should be developed, given our investment capability. Given our need to maintain a robust economy, how should we move forward?

So that might mean, for example, that if there were some mechanism as you described, it might be one part oil drilling and two parts further efficiency gain. We would be better off economically and environmentally than allowing nothing to happen at this point.

Mr. Brady. Right.

Mr. Laitner. I would need to think about that more, but in order to break open the discussion that needs to be put on the table.

Mr. Brady. That is the kind of thinking we need.

Mr. Yergin. Right. I think that—I don't know and am very interested to understand more clearly the jurisdictional issues between the states and the Federal Government, between 3 and 12——

Mr. Brady. Sure.

Mr. Yergin [continuing]. And farther out. I would rather not call it "the nose-holder." I would rather call it the "Grand Bargain. I think that as part of addressing conservation and new technologies, that offshore is clearly part of that.

I think we should recognize that the same advance in tools that make possible the kind of advances in efficiency that today drilling offshore is a very different industry than it was 20 or 30 years ago. It is space age, it's extraordinary in terms of its capabilities and its abilities to do thing right.

We see countries like Norway, which is the greenest country on earth in terms of policies, have found a way to address the offshore. And about a third of the world's oil today comes from the offshore. So it is an important resource.

What you describe in terms of our natural gas needs next winter, that is going to be something. We are now focused on gasoline. Next winter we will be focused on natural gas, and that is part of the picture.

I just wanted to add one other thing to Chairman Schumer's question about how quickly. There is still this people deficit issue that is a big issue. I was just thinking as part of the National Petroleum Council study last year that found that 55 percent of the

petrol professionals, as you'll call them, engineers and scientists, are within 10 years of retirement.

So there really is a missing generation in terms of energy technology in our country.

Mr. Brady. And I think, too—and I will close with this, Mr. Chairman—I think one of the reasons we are seeing perhaps a discouragement of new energy workers is that some of our policies here in Washington I think tend to discourage that investment of human capital.

For example, two years ago Congress, worried about the outsourcing of manufacturing jobs, passed legislation that creates a lower manufacturing tax if you produce, invest, create jobs here in America; a higher one if you do that overseas.

Unfortunately, this Congress has continued to pursue tax changes that would single out one industry, energy, to basically say, no, you do not qualify for that tax credit any more. In fact, we are going to—when you invest in American workers, in American production, in American exploration, we will actually raise your taxes to do that.

I cannot imagine that we are going to lower gas prices or make more timely investments by actually discouraging companies from exploring, and producing, and creating jobs here in America. That may be part of the problem we are having attracting and recruiting not just engineers, researchers, Hispanic workers, union workers, skilled welders, it's a broad range, 2 million energy workers today. I think we need to do more of that, not less.

I yield back, Mr. Chairman.

Chairman Schumer. Thank you.

Congressman Cummings had four hearings today, so he is a little bit late. We said we would close at 11:30, but we are going to make a little exception with the okay of the witnesses so that Congressman Cummings can ask his full round of questions.

Mr. Cummings. Thank you very much, Mr. Chairman.

Mr. Laitner, you state in your written testimony that increased energy efficiency has played a significant supporting role in the growth of our economy.

Essentially you argue that increases in energy efficiency have resulted in a lower per capita energy use in 2008 compared to the trends that could have been expected in 1970 had the energy efficiency increases not occurred.

Can you comment on how much of the increase in energy efficiency resulted from specific government policies, and how much resulted from technology improvements that industry chose to bring about without prompting from the government?

Mr. Laitner. A very interesting question and, not to be a middle-of-the-roader on it, I think it has been both. There has been some amazing innovations on the industrial side. We tend to think of industry as a user of energy, when in fact in many ways they are the source of the innovations that we are all putting to work.

Work I have been doing recently with the likes of Dell Computer, Intel, and others, Verizon, a number of firms like that, I am quite stunned at the level of innovation that they are putting into this effort.

Part of it is market driven; they are trying to be competitive, but clearly a source of innovation. And I would have to say it is probably on the order of maybe half of the efficiency gains, if you want me to put it in that rough measure, has been because of industrial innovation.

But the other half has come from a combination of price to an extent, but more critically government policies. And Chairman Schumer has raised the issue of California, what they have done. They have enacted a variety of standards. They have funded a number of programs. They have provided a great deal of information, technical assistance, and incentives to move more aggressively with respect to increased efficiency.

And at the federal level we have seen everything from a very successful, voluntary Energy Star Program that I think is a resource that needs to be deployed more fully, and recognized more credibly than has been, but also other things like standards for appliances and consumer products.

So that there has been a mix. There has not been a single silver bullet to be sure, but it has been a very dynamic mix. The issue then becomes how to enrich and build on that resource to really extend the full potential that can be there should we make that decision.

Mr. Cummings. It is interesting. As you were talking I was just thinking that yesterday I met with some bond counsel and they were saying that there is a lot of new bond work coming up, municipal bond type work, whereby the companies are going in and showing municipalities how they can save, and they make arrangements—the savings are so great with regard to energy, the savings are so great that in many instances they have been able to cut energy consumption in half.

Baltimore and a number of other places are looking into doing more of that. That is just a very interesting thing, to think that you can cut that much use of energy. And when you multiply that throughout the country, you are talking about quite a bit.

As a member of the Transportation and Infrastructure Committee, I read with great interest your comments on our Nation's transportation infrastructure.

Unfortunately, many of these measures such as co-funding local land-use planning and developing policies to expand alternative modes of freight transportation are geared more towards the long-term.

Are there measures that you would recommend that could be implemented more immediately?

Mr. Laitner. Yes. One of the measures I have already referenced earlier is the movement towards a telecommuting and video conferencing capability at the Federal Government and at the municipal level, but within industry.

One of the reasons in fact I am no longer at the Environmental Protection Agency is because my management did not like me telecommuting. I could be with my daughter's riding lessons and talking to people in Russia, and she insisted I had to be in the office because that's where you forced me to be. It was Congress that set up that, and I had to adhere to that.

So extending the ability of telecommuting and video conferencing at all levels I think can go a significant way to reduce transportation requirements. I mentioned earlier I took a trip to Stockholm just a couple of months ago by walking down the street in a very high-quality participation in a video conference with 20 of my colleagues in Stockholm and me here in D.C. I saved almost 4000 pounds of carbon dioxide by not traveling that distance. It saved me two days of time and cost me $200 to get the job done.

I think we would be surprised at the extent of what we could do with information communication technologies to leverage greater efficiencies in freight, in logistics, personal travel, entertainment, and just general worker productivity.

Mr. Cummings. I recently talked to some newcomers to Baltimore. Baltimore is changing drastically, and a number of them said that they came to the City from the country because of gas prices. And it was just more convenient.

I look at what is happening in Washington and other places and I guess it is much easier to live where you work and so that if you are not commuting an hour, an hour and ten minutes one way, that is quite a bit of savings. I had not thought about it from that perspective.

I think that what will happen is a lot of your urban areas will probably continue to grow much faster than they normally would have, and I think this gas situation has caused a number of people to do that, to move into the more urban areas. Would you agree?

Mr. Laitner. I would absolutely agree. And if I might comment on your suggestion about communities more generally, as a source of effective action, to the extent that we think about greater energy productivity as a form of economic development, communities can become a critical deployment resource to get the job done.

I with a number of other architects have put in a bid for the City of Elgin, outside of Chicago, to help them redesign much of their economic activity with that precise goal in mind, to deliver quality investment in ways that build on the information broadband infrastructure, but in ways that also allow greater productivity from transportation and from entertainment and their own personal working capabilities. I think it is a critical opportunity.

Mr. Cummings. Thank you, Mr. Chairman.

Chairman Schumer. Well I want to thank all our panelists, and particularly our witnesses. I think it was very instructive.

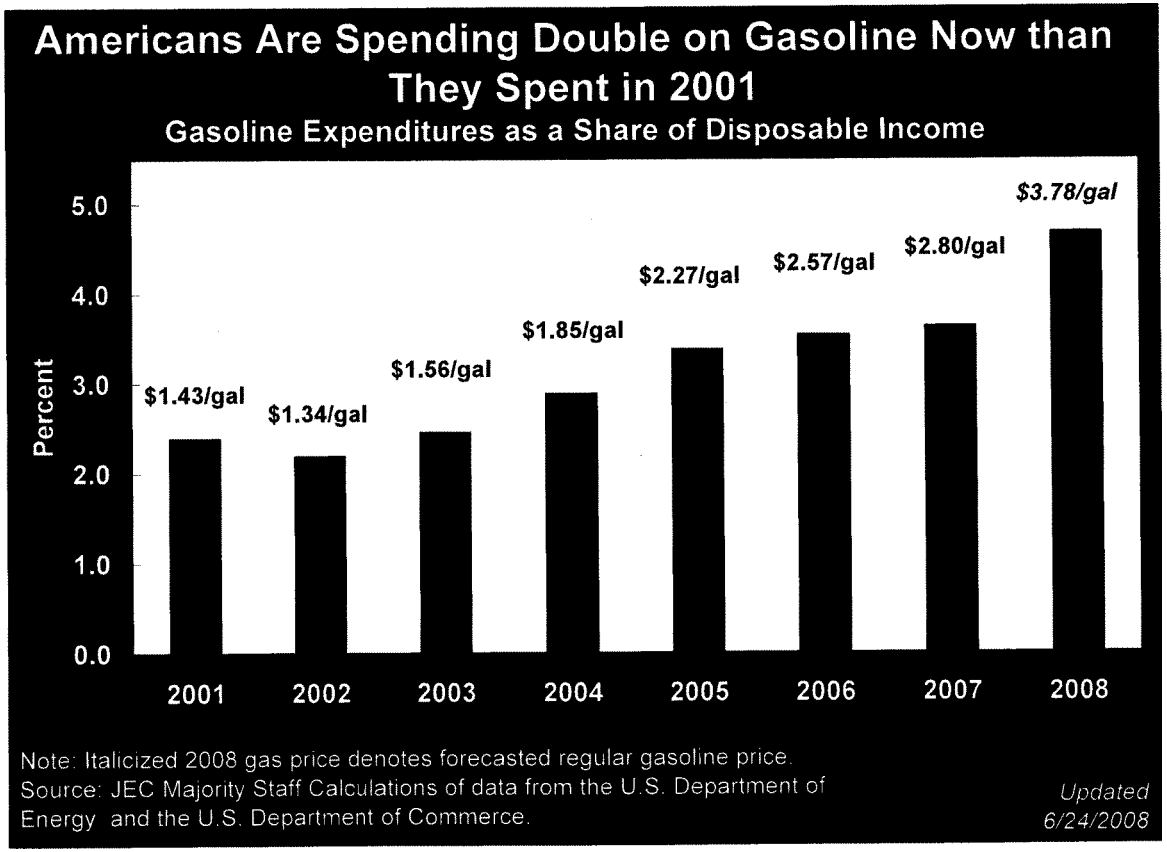
Two points. First, it was good to hear that Dr. Yergin, who is one of our great experts here, believes that prices may well come down over a period of time. That is good news, and maybe that will help the psychological problems that we are talking about.

And second, I was heartened to see on both sides of the aisle here, as well as on the panel, at least the little seedling of perhaps a grand compromise. Because I do think we need it, and I would certainly be one who would be very much eager to pursue that in terms of energy.

So with that, let me again thank everybody. This was a very productive hearing, and we are adjourned.

[Whereupon, at 11:34 a.m., Wednesday, June 25, 2008, the hearing was adjourned.]

Submissions for the Record


Americans Are Spending Double on Gasoline Now than They Spent in 2001
Gasoline Expenditures as a Share of Disposable Income
Percent
5.0
4.0
3.0
2.0
1.0
0.0
$1.43/gal
$1.34/gal
$1.56/gal
$1.85/gal
$2.27/gal
$2.57/gal
$2.80/gal
$3.78/gal
2001
2002
2003
2004
2005
2006
2007
2008
Note: Italicized 2008 gas price denotes forecasted regular gasoline price.
Source: JEC Majority Staff Calculations of data from the U.S. Department of Energy and the U.S. Department of Commerce.
Updated 6/24/2008

JOINT ECONOMIC COMMITTEE
SENATOR CHARLES E. SCHUMER
CHAIRMAN

Opening Statement of Senator Charles E. Schumer
Chairman, Joint Economic Committee
Hearing: "Oil Bubble or New Reality: How Will Skyrocketing Oil Prices Affect the U.S. Economy?"
June 25, 2008

Good morning and thank you for coming to today's Joint Economic Committee hearing on the skyrocketing price of oil. We want to explore whether the high price of oil is a bubble or a permanent, painful reality; how it will affect our economy; and what we can do to reduce prices and break our dependence on foreign oil.

We know that gas prices, and the high price of oil and all oil products, is the number one issue in America. Everywhere we go – legion halls, parades, weddings – this is one of the very first things people bring up. **It is no wonder that Congress has held about 40 hearings on oil and energy policy so far this year – and 11 this month alone.**

We're all looking to find the answers to some pressing and important questions so we can shape the right economic and energy policies going forward. I'm hopeful that we'll have some luck answering those questions today from our very distinguished panel, including Dr. Dan Yergin, Pulitzer Prize-winning author of The Prize and one of the world's foremost experts on oil and energy. We eagerly look forward to hearing from him and from Dr. Frederick Joutz (*Yoots*) and Skip Laitner shortly.

I think everyone would like to believe that high oil prices *are* a bubble – but they may not be. Many would also like to believe that there is a silver bullet that can pop the bubble. But if there is no oil bubble, or prices temporarily decline and we put off doing the necessary things we have to do – like conservation or investing more in alternative fuel incentives – we'll be even further behind than we are now from breaking our foreign oil dependence.

It is clear that demand is definitely on the rise – especially in rapidly developing, large countries like China and India. I heard the other day that there will be as many new cars in the developing world as there will be total cars in the U.S. in the next 10-15 years. In fact, the Energy Information Administration is projecting that oil prices will have increased by almost 70 percent from 2007 to 2008, gasoline price will increase by 35 percent, and diesel prices will increase by 50 percent.

I think it is interesting that the big oil companies and OPEC are blaming speculators for out of control prices, when they may be much more of the cause. It isn't as cut and dried to me. Speculation may be exacerbating the demand problem, but if we guess wrong on the cause we will put off the right solutions. There are some things that can be done to curtail the impact of speculation, like raising margin requirements and strengthening regulations; and these

may do some good, but they may not solve the problem in the long-term particularly if we think these are the only things that should be done.

The reality is that we need to look beyond quick fixes that will do little for consumers as they pay record prices at the pump.

Many consumers are experiencing stagnant wages, sending a much bigger slice of their paychecks right into their gas tanks. **Americans are spending DOUBLE on gasoline now than they spent in 2001. Across the nation, families are being shaken down for 5 percent of their take home pay – just to pay the Gas-Man.**

Low and middle income families are particularly hard hit – the most recent data from 2006, when gas prices were only $2.50 per gallon, shows that the lowest 20% income levels spent nearly 10 percent of their paychecks on gasoline. That is a scary figure for families who are just scraping by everyday.

For all of the talk about how American families have benefited from the Bush tax cuts, and for all of the emphasis that Senator McCain is placing on making those tax cuts permanent, the simple, undeniable, you-can-look-it-up, no-spin truth is that the average American family is paying for more in higher gas prices this year than they received in Bush tax cuts.

A lot of Americans are wondering what Washington can do to bring down oil prices or reduce our dependence on oil?

Well – let me first tell you what Washington didn't do. **With 7 years under their belt, this White House has taken zero pro-active steps to reduce our dependence on foreign oil. If it wasn't for the Democratic Congress passing a long-overdue, small increase in fuel efficiency standards for cars, President Bush would leave the White House with a spotless record – committing no sins against Big Oil or OPEC.**

With almost 70 percent of all of the oil we consume going into our gas tanks, it is a crime against our future that the White House and the Republican Congress since 1995 have opposed increasing fuel economy standards for so many years.

Even now in the midst of $140 per barrel oil and $4.00 gasoline prices, the only solution many of my friends on the other side of the aisle are familiar with is drilling in the Arctic Refuge. By 2018, ten years from now, ANWR might produce enough oil to according to the Department of Energy, decrease gas prices by only one to four cents a gallon *in 2018*.

The only short term way to increase supplies right now leads directly to the sands of Saudi Arabia. As we see here, OPEC is producing oil well under its capacity, despite record oil prices. Saudi Arabia is the 800 pound gorilla of oil production and even after modestly increasing production this weekend, they still have considerable excess capacity. Most experts believe that they could produce another million barrels, which would have an immediate impact on price. Saudi Arabia is actually producing below their 2005 production levels.

But in the long-term, we must address the demand side of the oil equation.
One good thing that came out of the oil shock in the 1970's was the push for dramatic energy conservation. Why don't we do more of it now? It would reduce prices at the pump and it would probably be the easiest thing to accomplish legislatively. California made Herculean efforts under Governor Jerry Brown during that time to reduce consumption and now they are well below the national average in energy usage per capita. As one environmentalist said, alternative fuels are the sizzle, but conservation is the steak.

Even as someone who supported targeted oil drilling in the East Gulf, I know you can't drill your way out of the problem. If you don't do conservation, if you don't do alternative energy, and if you don't tell the big oil companies they can no longer run energy policy in America, we will not succeed, plain and simple.

There were two main things, in my mind, that really sent our nation way off track on energy policy: First, low prices we were paying made us complacent; and second, the power of the oil, utility, car companies, which has prevented us from enacting real alternative energy programs.

There are a lot of questions – I hope we can get some good answers today from our distinguished panelists.

Witnesses:

Dr. Daniel Yergin, Co-founder and Chairman of Cambridge Energy Research Associates

Dr. Frederick Joutz, Professor of Economics and Director, Research Program on Forecasting, George Washington University

John A. "Skip" Laitner, Director of Economic Analysis for the American Council for an Energy-Efficient Economy (ACEEE)

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JOINT ECONOMIC COMMITTEE
SENATOR CHARLES E. SCHUMER, CHAIRMAN
REPRESENTATIVE CAROLYN B. MALONEY, VICE CHAIR

Statement of Carolyn Maloney, Vice Chair
Joint Economic Committee Hearing
June 25, 2008

Good morning. I would like to thank Chairman Schumer for holding this timely hearing to examine the global energy markets and the impact of sustained high oil prices on the U.S. economy.

Just a few months ago, it was shocking to see oil rise above $100 a barrel. Now, it's trading at record highs above $138 per barrel – double the price from last year. Consumers are feeling the pinch on their pocketbooks whether it's paying over $ 4 a gallon at the pump or seeing higher grocery bills as rising fuel costs drive up food prices.

The question on the minds of all Americans is – are high oil and gas prices here to stay?

Many energy analysts believe that a large part of the recent rise in oil prices has been caused by increased demand in developing countries, such as China and India. Oil prices are expected to rise alongside the expansion of these countries over the long-term.

In the short-term, the economic downturn here in the U.S. and the weak dollar have also contributed to rising oil prices. The Federal Reserve has lowered its target rate to 2.0 percent, which has led to a fall in the dollar, relative to other currencies. Instead of seeking the safe haven of U.S. Treasury Bills, investors have been looking to commodities – including oil – as a hedge against inflation, thereby driving up prices. As our witness Daniel Yergin puts it, oil has become "the new gold."

Financial markets and oil markets have become intertwined as never before. As the amount of non-commercial trading of oil has increased, Congress must scrutinize how much of the run up in oil prices is due to speculative manipulation. One potential way to deter speculators from driving up prices is H.R. 6264 – a bill proposed by Rep. John Larson, that I have co-sponsored, to prohibit anyone without the ability to actually accept delivery of crude oil from buying a futures contract.

Americans are paying a hefty price for the Bush Administration's failure to pursue a sensible energy strategy over the past seven years. Meeting the energy needs of our nation will require achieving greater efficiency and investing more in renewable fuels. We cannot drill our way out of this problem, as the Administration and my colleagues on the other side of the aisle would have us believe.

The United States has less than 2 percent of the world's oil supply, but we currently use 24 percent. Drilling in the Arctic National Wildlife Refuge would not yield oil for 10 years and at it's peak production in 22 years, it would only save consumers about 2 cents a gallon on gas.

- more -

Drilling on the outer continental shelf would have an "insignificant" impact on oil prices at peak production, according to the Energy Information Administration. Oil companies already have 68 million acres of federal oil reserves leased for development, and the House will soon take up legislation (H.R. 6251) that will require oil companies to use those leases – or lose them.

We are building on steps the Democratic-led Congress has already taken to lower oil prices and reduce our dependency on oil by expanding tax incentives for renewable energy and creating green jobs to spur American innovation and business investment.

The Energy Bill signed into law in December included provisions to combat oil market manipulation and increase vehicle fuel efficiency to 35 miles per gallon in 2020 – the first Congressional increase in more than three decades. This spring, we suspended the Strategic Petroleum Reserve, which will put more oil on the market and help drive down gasoline prices. And we have overridden the President's veto of the new Farm Bill, which makes a historic commitment to more affordable homegrown American biofuels and increases Commodity Futures Trading Commission authority to detect and prevent manipulation of energy prices.

Congress continues the fight to bring down the price of gas and make America more energy independent. Our nation's continued prosperity depends on meeting the challenge of our energy needs and bringing relief to American families.

Mr. Chairman, thank you for holding this hearing and I look forward to the testimony today.

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JOINT ECONOMIC COMMITTEE
Senator Sam Brownback, Senior Republican Senator

Opening Statement of Senator Sam Brownback
"Is the Skyrocketing Price of Oil a Bubble or a New Reality for the U.S. Economy?"
June 25, 2008

Thank you, Mr. Chairman. I want to express my appreciation for you scheduling today's hearing to examine the present dynamics of the global oil market. The questions asked by today's hearing title: "Is the Skyrocketing Price of Oil a Bubble or a New Reality for the U.S. Economy?" is–appropriate. I do not believe, however, that the answer is necessarily a matter of one or the other.

The answer to the question may depend on what we in the Congress do to address the nation's energy supply challenge.

America must get to work producing more energy. The Republican program for solving economic problems is based on growth and productivity. Large amounts of oil and natural gas lay beneath our land and off our shores, untouched, because the present [congressional majority] seems to believe the American people would rather see more regulation, more taxes and more controls than more energy.... [America] must not be thwarted by a tiny minority opposed to economic growth which often finds friendly ears in regulatory agencies for its obstructionist campaigns. Make no mistake. We will not permit the safety of our people or our environmental heritage to be jeopardized, but we are going to reaffirm that the economic prosperity of our people is a fundamental part of our environment.

I would like to take credit for that being an original thought, Mr. Chairman. I have paraphrased slightly – for instance to refer to the Democratic majority in Congress instead of the Carter Administration. Those words were spoken 28 years ago by Ronald Reagan as he accepted the Republican nomination for President in Detroit, Michigan.

We do not have the luxury to sit idly by and artificially restrict the use of our own domestic supplies of energy. Yes, those supplies must be used with extreme caution to ensure that we do not damage the environment. Other nations like Norway do so, and there is no reason we cannot also utilize all of our resources if we are willing to hear the cries for relief of the American working men and women instead of anti-development, anti-growth activists.

This nation's undiscovered technically recoverable federal reserves amount to 112 billion barrels of oil. Estimates are that we could produce between 500 billion and 1 trillion

barrels of oil from United States oil shale. The combined proven reserves of Saudi Arabia, Iran, Venezuela, and Russia are 530 billion barrels. Those on the other side of the aisle continuously argue that exploration and development of domestic energy sources will yield only minimal effects on global energy markets and will take years to bear fruit. But they fail to understand the effects on expectations, among other things, that a clear signal that the U.S. will safely develop all means available to move closer to energy independence would produce. And, if every year we say that it will take years for domestic exploration activity to bear fruit, we will never see the fruit. The argument is tantamount to telling farmers that they should not plant seeds, since we won't see the results in terms of crops until after a season passes.

Many on the other side of the aisle like to rail against this Nation's trade policies, our trade deficit, and the value of the dollar. Yet, they remain unwilling to take the most fundamental step of reducing our dependence on foreign oil by developing our own resources. And in the process, they deprive our economy of capital and our workers of jobs.

We need to be very careful when we move to intervene in these markets that we do not trigger the law of unintended consequences by forcing investment activity away from our markets to overseas markets. We need to evaluate the words of many knowledgeable economists who argue that changing the way our markets work may actually serve to increase volatility rather than reduce volatility.

This does not mean there should not be greater transparency and greater vigilance on the part of those who regulate futures markets. We need both. We do need to examine the activities of pension funds in commodity markets. Their activities are not readily transparent, as they should be. Commodity markets are volatile by their very nature. Pension funds should, first and foremost, protect the retirement funds of the workers they exist to serve. Noted economist Jim Hamilton wrote on his blog that when he "heard about the disastrously irresponsible investments made by the Amaranth hedge fund, [his] first reaction was, who would be so stupid to have put up the margin requirements for such a scheme?" His answer turned out to be in his own backyard. According to Hamilton, the San Diego County Employees Retirement Association apparently put up $100 million. Hamilton's research turned up that Amaranth was only a portion of the pension fund's exposure to what it termed "alpha engine managers."

We know that many pension funds were badly hurt by their exposure to subprime mortgages and real estate investments. I firmly believe that we should act quickly on this matter. Whether you believe that there is a bubble about to burst in commodity prices or you believe that prices will continue to advance higher because of market fundamentals, commodity markets are extremely volatile and involve a significant degree of risk. Playing

the wrong side will bring swift and significant negative results. We should act to impose strict limits on the level of exposure that pension plans may have in these markets.

The taxpayers are already potentially on the hook for nearly $30 billion as a result of the Federal Reserve's backstopping of the JP Morgan acquisition of Bear Stearns. We cannot afford to risk putting American taxpayers and retirees on the hook for another bailout, especially when our failure to heed Ronald Reagan's words nearly 30 years ago has contributed significantly to the $4 plus a gallon price of gasoline they are paying.

Let's "just say yes" to developing American energy resources with American jobs for a change.

JOINT ECONOMIC COMMITTEE

UNITED STATES CONGRESS

"OIL AT THE BREAK POINT"

PREPARED TESTIMONY:

Dr. Daniel Yergin

Chairman

Cambridge Energy Research Associates

June 25, 2008

Washington, DC

PREPARED TESTIMONY:

"OIL AT THE BREAK POINT"

Daniel Yergin, Chairman, Cambridge Energy Research Associates

Chairman Schumer, Vice Chair Maloney, Ranking Members, and, distinguished Members of the Joint Economic Committee:

It is an honor to appear before the Joint Economic Committee. I would like to express my appreciation to the Committee for the opportunity to appear this morning. In calling this hearing, the Committee is expressing its great concern about the impact of energy prices on the American public and the economy, and demonstrating the seriousness with which the Committee is seeking to understand and frame the issues. The Committee is wise to undertake and encourage this searching examination while policies are being considered and before they are framed. I am grateful for the chance to contribute to this consideration.

This morning I wish to focus on four specific aspects of the issue:

The "Oil Shock" and its causes, including the "traditional fundamentals" (supply and demand, geopolitics) and the "new fundamentals" (rapidly-rising costs for developing new oil and gas fields, and the increasing impact of financial markets).

The "Break-Point" world in which we are now living—and the forces set in motion by high prices, security, and reinforced by climate change.

The considerable opportunity for energy efficiency, which can make a very big impact in the near- and medium-term.

Observations on policy, including:

- the need to get beyond "either/or" energy debate and instead take a more ecumenical approach that recognizes the critical requirements of supplying energy to our $14 trillion economy;
- the importance of encouraging investment, which has to be increased in order to play "catch-up" with a growing world economy;
- the effectiveness and speed of markets in responding to shocks; and

- the way in which expectations going out 3 to 5 years are feeding into today's prices and how changes in supply and demand can influence those expectations.

I. Today's Oil Shock

That we are in an oil shock is clear, whether at the gasoline pump and the toll on consumers, in the obvious and painful impact on beleaguered industries like autos and airlines, in the effect on food prices, and in the financial difficulties that other industries are experiencing. This oil shock coincides with the credit crisis, adding to the pressures. The specter of stagflation—poor economic growth combined with inflation—supposedly banished since the 1970s, is before us again. Jean-Claude Trichet, the president of the European Central Bank, starkly outlined the risks when he recently noted the current "similarities" to the first and second oil shocks of the 1970s:

> One of the major similarities of course is that we must avoid unanchoring inflation expectations, avoid putting economies in general in a situation where they are weakening their own growth potential, where they are observing slower growth and mass unemployment...You can date from the first oil shock the start of much lower growth...[1]

Four years ago oil was around $40 a barrel. Today, it is over $135 a barrel, and there are alarming predictions of $200 and $250 a barrel—and even higher. What happened? What is happening?

In such circumstances as these, there is a tendency to seek a single explanation. History, however, demonstrates that changes of this scale and significance result not from a single cause, but rather from a confluence of factors. And that is the case with the epochal change in energy through which we are now living. When you consider the pressures in the markets, the impact on consumers and the economy, and the shifts at hand, we really are at a break point in terms of world oil.

We can divide the sources of the current high prices between the "traditional fundamentals" and what we might call the "new fundamentals".

The Traditional Fundamentals

The starting point is supply and demand. Specifically, in terms of demand, we are talking about the success of the global economy—five percent growth per year over the past five years—the best global economic performance in a generation. This has lifted hundreds and hundreds of millions of people out of

[1] Jean-Claude Trichet, press conference, June 5, 2008, http://www.ecb.int/press/pressconf/2008/html/is080605.en.html

poverty. Countries—most notably China and India—that for decades lived in self-imposed economic isolation are now integrated with the world economy. Growing incomes and rising standards of living translate into rising demand for oil and energy and other commodities. We can see the difference. In the five years between 1998 and 2002, world oil demand grew at an average annual rate of 1.1 percent—for a total absolute growth of 4.2 million barrels per day. In the five years between 2003 and 2007, world oil demand grew at 2.1 percent—for a total absolute growth of 8.2 million barrels per day.

Supply has had trouble keeping up. As a result the balance between supply and demand has tightened. One major reason for the slow supply response is limitations around the world on access to areas for development. A second is uncertainty about investment, fiscal, and regulatory regimes. Both of these are global questions. So is the third reason—the shortage of people, equipment, skills, and commodities—to which I will return in a moment.

Refining issues contribute to the tightness in the markets. Though there is a tendency to see this as a U.S. issue, it is really a global problem. Diesel fuel is the fastest-growing oil product worldwide; over the last ten years, transportation diesel demand grew by 34 percent, while gasoline demand grew by 13 percent. It is the fuel of economic growth in Asia; over half of new cars sold in Europe are diesel. Yet Asia and Europe—the growth markets for diesel—have refining systems that are constrained in terms of producing diesel fuels.

Geopolitics has to be regarded as one of the traditional fundamentals, for in one way or another it has always had a major impact on the oil market. Geopolitics can make its influence felt through disruption or through fears and perceptions of risk regarding the reliability of supply.

We do not today have the mega-disruptions that were characteristic of the 1970s. However, when you add up various kinds of disruptions, you get an "aggregate disruption" of between two and three million barrels per day. Particularly noteworthy is Nigeria, one of the key exporting countries and one particularly important to the United States. For the past few years, 20 to 30 percent of Nigeria's output disrupted by rebel attacks. Currently, almost a million barrels a day of Nigerian oil has been removed from the market—representing a loss of 40 percent of Nigeria's capacity. Venezuela's productive capacity has declined by almost a million barrels per day from its peak. Iraq's production hovers below the pre-invasion levels. Mexico's capacity is declining because of inadequate investment and restrictions on international investment.

The result of all of this is a much tighter market—in terms of the balance between supply and demand—than had been customary for several decades. The tightness can be measured in terms of "spare capacity"—the unused production capacity that can be called upon in case of disruption. As recently as

2002, spare capacity was 5 million barrels per day. By 2005, it was down to one million barrels per day. It increased to about 2.5 million barrels per day in 2007, but with the recent increase in Saudi production, it is again declining. In a tight market, prices go up. And a tight market is also a market that is more crisis-prone, more vulnerable to the impact of disruptions.

The dangers and uncertainties related to Iran's nuclear program are also a distinctive feature of today's oil market. As Iran's centrifuges whirl, concerns mount about the potential for crisis and confrontation, which could affect not only the reliability of Iranian supplies, but also could affect some portion of the oil passing through the Strait of Hormuz—representing 40 percent of traded world oil. There is clearly an Iranian risk factor in the price of oil today.

The New Fundamentals

What have emerged as the "new fundamentals" are also playing an important role in the sharp upward movement of oil prices.

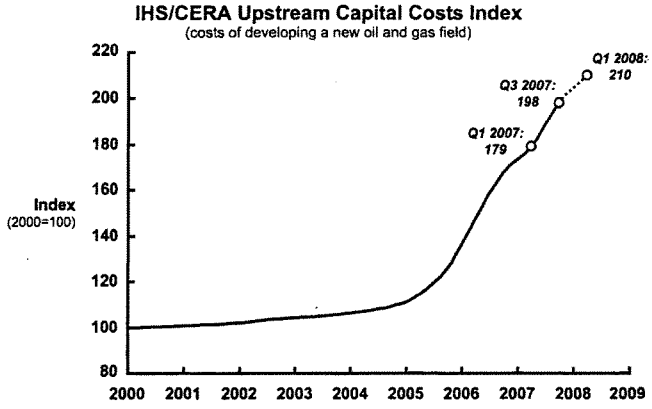
Doubling of Costs

The first of the new fundamentals is the rapid rise in the cost of new oil and gas fields. Both the public and public policy focus in on price. But the dramatic increases in costs are bedeviling the industry, delaying new supplies, and constitute one of the major reasons for rising prices.

Cambridge Energy and its parent company IHS, which has the world's largest databases on oil and gas reserves and production, have created the IHS/CERA Upstream Capital Costs Index to measure the impact of rising costs. The results are dramatic. The latest analysis shows that costs worldwide have more than doubled over the last four years (See Figure 1).[2] This means that every dollar of investment buys only half of what it would have bought four years ago. To put it another way, companies have to budget twice what they would have for the same project four years ago. Some examples are even more extreme: a deep water drill ship that would have rented for $125,000 per day four years ago now costs $650,000 per day.

Why these cost increases? The reason is that there is an acute shortage of the engineers and scientists, skilled labor, equipment, and of the steel and other commodities that are required to develop new supplies. As a result, the cost of everything that is required to develop new oil and gas fields is being bid up around the world.

Figure 1
IHS/CERA Upstream Capital Costs Index
(costs of developing a new oil and gas field)



Source: Cambridge Energy Research Associates.
70113-3_2104

Why these shortages? In the early 1980s, there was a similar expectation that prices would go sky-high. Then the prediction was of "$100 a barrel oil", which, in today's dollars, would be about $300. Instead, the oil market experienced two price collapses—to $10 oil in the mid 1980s and again in the late 1990s. As a result, the industry went through a contraction, preparing for a long haul of low prices. Indeed, there is a "missing generation" of engineers and technologists in the oil and gas industry. Just as the contraction was more or less finished, demand started ratcheting up again with the strong global economic growth. The industry has been scrambling ever since to catch up with this growth. At the same, overall global demand is driving up the cost of such critical inputs as steel and cement.

The impact of the shortages is two-fold. The first is that projects cost more. Second, the projects are being delayed, postponed, and in some cases cancelled. Thus, the supply response is taking longer, which contributes to a tighter market and helps drive up prices.

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[2] Capital Costs Analysis Forum—Upstream: Market Review, CERA Special Report, 2008.

At the same time, governments around the world are increasing their taxes and take, adding to the cost squeeze that is constricting supply and putting pressure on the commerciality of new projects.

Oil—the "New Gold": the Integration of the Oil Market and Financial Markets

The second of the new fundamentals might be described as "oil as the new gold." Oil has become a storehouse of value—reflecting broad global economic trends and imbalances. At the same time, oil is increasingly seen as an asset class by financial investors, an uncorrelated alternative to equities, bonds, and real estate. This is a development that has only really emerged in the past few years as more and more financial investors and investment has come into the oil market. The role of financial markets in the oil price, as we all know, is a very controversial subject. There are some who believe that "speculators" are the culprit. There are others who believe that the impact is minor, and that supply and demand largely explain things.

The role of "speculators" in the commercial oil market has received much attention recently. The word "speculator" has both a technical meaning and a colloquial meaning. In the technical meeting, it describes those who trade with the objective of making profit by successfully anticipating future price movements. Speculators add liquidity to the market, taking the other side of trades that allow commercial participants—such as independent natural gas producers, airlines in the oil market, or farmers in agriculture markets—to hedge their risk. In this role, speculators help make markets possible. However, the colloquial meaning of "speculator" has a range of different connotations, ranging from manipulator to risk-taker to those who collectively get caught up in "irrational exuberance" and help generate bubbles. All these are more controversial than the technical meaning. However, the focus on the word "speculator" is too limited.

Financial markets are today playing an increasingly important role in price formation – responding to, accentuating, and exaggerating supply and demand, geopolitics, and other trends.

The interests of financial participants in the oil market are varied. Some are doing what traders do, looking for momentum and trends. Some are doing it as an "alternative investment," to secure, for their pension-holders, sufficient income from assets that generate returns not correlated with the performance of stocks and bonds. Some invest in oil as a proxy for economic growth in China and India. For others, investing in oil has become a hedge against a variety of risks and threats. Some are investing in oil to protect themselves against rising global inflation. A pension fund may invest in oil to protect its portfolio against a possible sharp drop in equity markets in the event of conflict in the Middle East. (One prominent U.S. pension fund recently explained that it was increasing its investments in commodities as

part of a "new strategy to provide a hedge against inflation while diversifying investments, thus mitigating losses during equity market downturns.")

And some anticipate a permanent shortage – in its strongest form, the world's "running out" of oil. A "shortage psychology" certainly seems to have become widespread in financial markets as prices have gone up. This psychology is based partly on current market conditions and partly on expectations of tight markets for many years to come. As prices go up, this psychology becomes self-reinforcing – at least until the market turns.

The U.S. credit crisis and the weakening U.S. dollar constitute a significant factor. For, when the credit crisis broke last summer, the response, as would have been anticipated, was interest rate cuts. These, in turn, led to a fall in the value of the dollar against other currencies, amplified by expectation of further interest rate cuts. Instead of the traditional "flight to the dollar" during a time of instability, there has been a "flight to commodities" in search of stability during a time of currency instability and a falling dollar. While the correlation does not hold week-in and week-out, we believe that this trend—a falling dollar contributing to higher oil prices—is very strong.[3] Figure 2 shows the movements since last summer, and Figure 3 shows how the fall in the dollar has lowered the "euro price" for oil. There is a painful irony here. The crisis that started in the subprime mortgage market in the United States has traveled around the world and, through the medium of a weaker dollar, has come back home to Americans in terms of higher prices at the pump.

II. "Break Point": the New Scenario of World Energy

Prices do not usually go straight up forever. Markets respond to higher prices with behavioral changes, innovation, and substitution, and we are beginning to see that response. Two years ago we envisioned a scenario of $120-150 oil that we called "Break Point." The question was how delays and postponement in the development of supplies, combined with disruptions, could drive prices up to that $120-150 level.[4]

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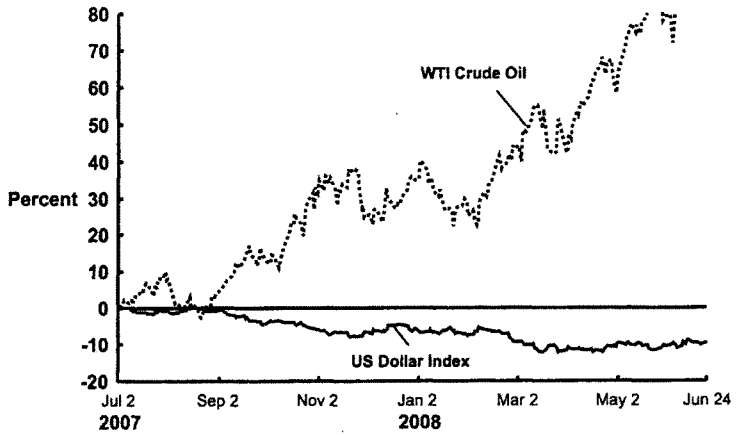
[3] The Federal Reserve Bank of Dallas estimates that "exchange rate movements accounted for roughly a third of the $60 increase in oil prices from 2003 to 2007." Stephen P.A. Brown, Raghav Virmani, and Richard Alm, *Economic Letter—Insights from the Federal Reserve Bank of Dallas*, May 2008, p. 6. It notes that the dollar has fallen 46 percent against the euro since mid-2001.

[4] Break Point Revisited: CERA's $120 - $150 Oil Scenario, CERA Special Report, 2008.

Figure 2
Dollar Decline and Oil Price Rise



Source: Cambridge Energy Research Associates.
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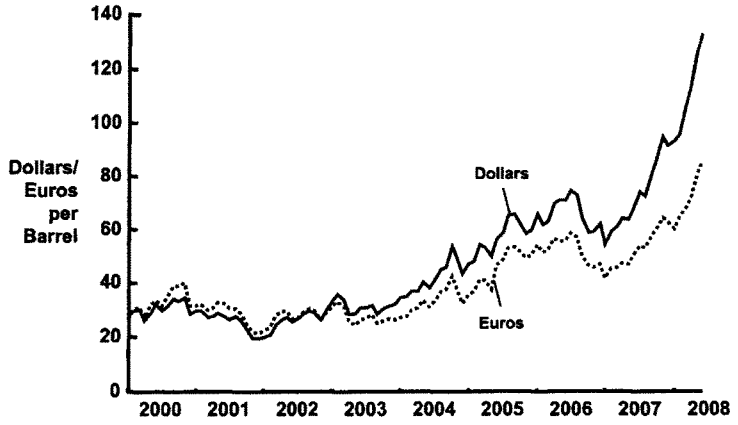
Figure 3
WTI in Dollars and Euros



Source: Cambridge Energy Research Associates.
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But the real focus in the scenarios was on the response. Today, we are seeing the beginning of a powerful response in terms of public policy, technology, consumer behavior, and company strategies:

- The first increase in automobile fuel efficiency standards in 32 years.
- The sharp shift towards fuel economy in the minds of consumers when they enter an auto showroom.
- The changes in behavior—whether measured in use of public transport, carpooling, consolidation of trips, or miles driven.
- Increased focus by companies on reducing their energy costs.
- And, of great significance and lasting importance, changes in the automobile engine itself and the accelerating speed with which automakers are trying, at great cost and in very difficult circumstances, to shift their model mix.

As the Committee knows, there is much talk about "peak oil" supply these days. However, we think something else is at hand— "peak demand" —at least in terms of U.S. gasoline consumption. In our view, 2007 may well have been the top, the peak, in terms of U.S. gasoline demand.[5] Both because of changes in the minds of consumers, and the response of automakers in terms of the efficiency of vehicles, gasoline demand may well now be in decline. (See Figure 4). This has worldwide effects. For the 9-plus million barrels of gasoline that the U.S. uses every day is larger than the total oil consumption of any other nation, including China.

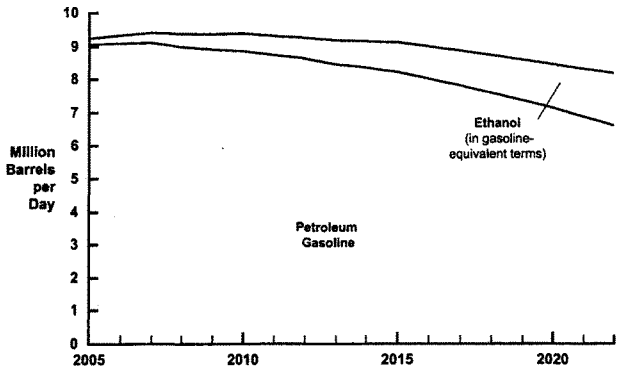
III. The Bounty of Energy Efficiency

One of the most important consequences of the Break Point scenario is the new focus on energy efficiency. It was the potential of energy efficiency—conservation—that first drew me into energy research. It is striking that the United States today uses only about half as much energy per unit of GDP as in the 1970s. Some of that represents restructuring of the economy towards services. But much of it represents actual gains in efficiency.

[5] Drivers Turn the Corner in the United States: Gasoline "Peak Demand," Sooner than Expected, CERA Decision Brief, 2008.

Figure 4

US Gasoline Demand: Break Point Scenario



Source: Cambridge Energy Research Associates, US Energy Information Administration.
Note: This calculation assumes that the biofuel goals set in the Energy Security and Independence Act of 2007 are met.
80515-10_2805

The reality of the current oil shock behooves us, as a nation, to consider what would be required to double our energy efficiency over a certain number of years. Today, there are tools in terms of information technology to support greater energy efficiency that were simply not available in earlier decades. In terms of the nation's gasoline consumption, savings of 7 to 10 percent—as much as 900,000 barrels per day—may be available with little or no penalty or burden on drivers.

Of course, "energy efficiency" is not a "thing", unlike a power plant, an oil well, a windmill, or a solar panel. It is embodied in other things—changes in behavior, in technology, and in the capital stock. It can be stimulated by regulations, information, and prioritization. But, in a market system, price itself is a powerful driver, and energy efficiency will get much higher priority now than in years when energy was cheap. It is not surprising that sales of SUVs and other light trucks took off in the late 1990s. In 1998,

owing to the collapse in crude prices, gasoline prices were the lowest in real terms that they had ever been.[6]

Climate change considerations will be a further driver of energy efficiency, for it offers the largest near and medium term way to reduce CO_2 output.

One is struck by how energy efficiency is gaining traction and support across the spectrum. As such, it will help us overcome the "either-or" approach and will be one of the key contributors to underwriting the energy response on which our nation's prosperity depends.

IV. Some Approaches to Policy

Avoiding "Either-Or"

So often, it has seemed over the decades, U.S. energy policy divides into an "either-or" debate, which sets conventional supply against renewables and conservation—as though one partial approach or another is sufficient. This is unfortunate. We need a more ecumenical approach, and indeed a portfolio strategy. Our $14 trillion economy runs on 100 quadrillion BTUs of energy per year—50 million barrels of oil equivalent per day (of which actual oil is currently somewhat over 20 million barrels per day).

Alternatives and renewables have and should have an important role to play in our energy economy, and their role will grow. *Crossing the Divide* outlines how that could happen.[7] But we also have to keep in mind the overall scale of our energy needs, costs, and time. A great deal of effort is going into innovation, and the impact will be significant. But the timing and scale remain uncertain. And, as renewables grow in scale, the question of how they are integrated into the existing energy infrastructure becomes more important.

Today, oil and natural gas together represent a little over sixty percent of our total energy consumption. Most of the rest are coal and nuclear. Renewables are about six percent; most of that is biofuels and hydropower. Given these proportions, and in light of today's high prices, it is urgent to ask how to ensure the adequate supplies of oil and natural gas supplies that are needed on an environmentally-sound basis and at a price that does not damage the overall economy.

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[6] Gasoline and the American People: 2007, CERA Special Report, page 6.

[7] Crossing the Divide: The Future of Clean Energy, CERA Muticlient Study, 2007.

Encouraging Timely Investment

The current oil shock underscores the need to encourage timely investment across the energy spectrum that will relieve the price pressures—both in the United States and abroad. Investment has to be stepped up in order to play a vigorous game of catch-up with a growing world economy. That, in turn, requires efficient and timely decision-making, whether in the United States or in resource-holding countries, as well as the facilitation of large, complex projects that bring on significant new supplies. An excellent example of the impact that engagement can make is the strong support that the U.S. gave to the Baku-Tiblisi-Ceyhan pipeline that carries oil from Azerbaijan through Georgia to Turkey. Without that pipeline, there would not be 700,000 barrels of Caspian oil flowing through to the Mediterranean today—and the addition to energy security that those supplies provide.

The Role of Markets

Markets themselves, with their decentralized decision-making, generally provide faster and more effective mechanisms for responding to high prices and shortages than systems of price control, which can have unintended and very painful consequences. The classic example is the contrast between the much-remembered "gas lines" of the 1970s and the surprisingly swift response to the disruption of Hurricanes Katrina and Rita in 2005—which constituted the largest energy disruption that the United States had ever experienced. The 1973 and 1979 gas lines were largely self-inflicted—the result of price controls and an allocation system that determined where gasoline supplies would go. There was little flexibility to move supplies to where they were most needed. Bureaucratic decision-making at the center could not possibly keep up with the changing character of the marketplace. Thus, gasoline was available in rural areas; there was just not enough gasoline in cities to get motorists out to the countryside so that they could fill up.

The response in 2005 was quite different. Mild relaxation of regulatory restrictions—on which gasoline grades were required in which cities, and on the Jones Act, which required that oil shipped from one U.S. port to another U.S. port be in American ships—meant that supplies were moved around efficiently, and prices subsided much more quickly than anticipated. (This was supported by release from the Strategic Petroleum Reserve and similar reserves held by other countries). The fears—such as gas lines spreading across the nation and airports running out of jet fuel—did not come to pass.

The U.S. and Global Markets

The United States is more integrated into the global marketplace than in years past, and yet it has less leverage over the market. Our oil imports today are twice what they were in the 1970s. Yet our share of world markets is less. In the 1970s, the U.S. represented 30 percent of world oil consumption. With

economic growth elsewhere, the U.S. share is down to 24 percent. The balance is changing in other ways. National oil companies—which vary greatly in their character and capabilities—control over 80 percent of world oil reserves. The five "supermajor" oil companies account for less than 15 percent of the world's total oil production. China and India are now significant players in the market. The list of shifts goes on.

The realities of the global markets and America's integration into them emphasize the need for a cooperative, multifaceted approach to relations with both producers and other consumers and put a premium on how we manage, think through, and structure our relations with other countries.

Price and Expectations

The final point to consider is the role of expectations. As suggested earlier, much of the conviction and buying in those markets where oil and finance intersect is due not only to the short-term—the latest disruption in Nigeria, the ratcheting up of tension over Iran's nuclear program—but also due to current expectations about very tight supplies three or five years down the road, particularly because of the anticipated high growth in countries like China and India. These longer-term expectations feed back into current prices.[8]

To be sure, in the current tight, crisis-prone market, prices would likely spike higher if there were a major disruption—or even imminent threat of such—particularly in a key region such as the Persian Gulf. Fortunately, we do have an emergency system built around the International Energy Agency that was created to respond to such crises.

But that more general expectation of very tight supplies is based upon the assumption that the global market cannot generate the responses that are warranted—in terms of demand and efficiency, in terms of new supplies and timely investment, and in terms of renewables, new technologies and alternatives. Delays and postponements are read as predictions of shortages. Meanwhile, developments of great importance—such as the very large discoveries in off-shore Brazil—get relatively little attention. Downward shifts in future demand from what would have been anticipated two years ago, are discounted.

The oil and gas industry is a long lead-time industry. New fields can take five to ten years to develop. But their impact is anticipated earlier in the price. A major contribution to alleviating today's oil shock would be to create an environment, based upon realistic assessments, that ensures that timely investment is really and convincingly on the way.

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[8] The importance of longer-term expectations is also emphasized in the Dallas Federal Reserve's *Economic Letter*.

The answer to the oil shock is not "either-or". We need an ecumenical approach—a combination of new supplies, renewables, and greater efficiency—all developed with appropriate environmental and climate change considerations in mind.

Such an approach would be a great contribution not only to relieving the pain and pressures that the American people are feeling at the pump and the difficulties that are faced today by American businesses, small and large alike. It would also be a fundamental contribution to the future prosperity of our nation and to the global economy of which we are so centrally part.

Joint Economic Committee Hearing

"Oil Bubble or New Reality: How Will Skyrocketing Oil Prices Affect the U.S. Economy?"

Wednesday, June 25, 2008

Testimony prepared by
Frederick Joutz,
Professor of Economics and Director,
Research Program on Forecasting,

The George Washington University

"Oil Bubble or New Reality: How Will Skyrocketing Oil Prices Affect the U.S. Economy?"

Since the 1970s, macroeconomists and energy economists have viewed large changes in the price of oil as a contributing source of economic fluctuations both domestically and globally. Large increases in oil prices on their own do not lead to recessions, falling incomes, higher unemployment, and rising inflation.

There do appear to be two facts which macroeconomists and energy economists agree on. First, the perception of the negative impact on the macroeconomy appears to be weakening. Second, while oil price increases may be associated with declines in economic activity, the reverse is not true. That is sharp declines in prices do not lead to expansions in economic activity.

I hope to describe the nature of the negative relationship between large increases in oil price and the U.S. economy this morning. Also, I hope report on recent evidence on the changes in the relationship since the late 1990s.

In the post World War II era, there have been 14 significant increases in the price of oil. According the National Bureau of Economic Research (NBER) there have been 10 recessions. I have added an 11th for current economic conditions. The oil price shocks have preceded the onset of the recessions by 1-5 quarters. Hamilton (1983) was the first to emphasize this possible relationship. He did not claim that oil price shocks caused recessions only that they contributed to the decline in macroeconomic activity.

Table 1
Dates of Oil Price Shocks and Recessions

(Positive) Oil Price Shocks	NBER Recession Dates
Dec-47	1948q4 (4)
Jun-53	1953q2 (4)
Feb-57	1957q3 (2)
Jan-00	1960q1 (3)
Mar-69	1969q3 (3)
Dec-70	
Jan-74	1973q4 (5)
Jul-74	
Jun-79	1980q1 (1)
Jan-81	1981q3 (4)
Aug-90	1990q2 (3)
Jun-00	2001q2 (?)
Nov-04	
Jan-07	2007q4(current)

Source: NBER and US EIA
Recession Dates: Quarter of peak and (number of quarters until trough in GDP)

In a recent study Blanchard and Gali (2007) discuss the evidence in favor of a moderation of the potential negative macroeconomic consequences following an oil price shock. Macroeconomists and energy economists have suggested that the impact of oil price shocks has been getting smaller. Their model suggests that a 10% increase in the real price of oil led to a fall in GDP of about -0.5% one year later and an increase in the CPI of about 0.5 before 1983. Since 2000 the impact of a 10% positive oil price shock appears to be -0.2% one year later and in increase in the CPI of 0.3% one year later (figure 1).

Blanchard and Gali compare the two major price increases of the 1970s with the two major price increases since 2000. I have added a third one since their period of analysis ended in December 2005. Since January 2007 the effective increase in the oil price has been double the earlier episodes. A major price increase is defined as a rise of more than 50%. These five significant oil shock episodes are described in Table 2 below.

Table 2
Major Post WWII Oil Price Shock Episodes

Episode	Run-up period	50% rise date	Cumulative log change in $	Cumulative real log change in $
E1	1973q3-1974q1	1974q1	104%	96%
E2	1979q1-1980q2	1979q3	98%	85%
E3	1999q1-2000q4	1999q3	91%	87%
E4	2002q1-2005q3	2003q1	113%	104%
E5	2007q1-present	2007q4	205%	207%

Note: episode 5 is based on author's preliminary estimates and is based on 17 months of data.

The impact of these oil price shocks on macroeconomic activity for industrialized countries and the change in effect across episodes can be illustrated in the tables 3 below. Again, these are summarized from Blanchard and Gali.

Table 3

Oil Price Shock Episodes and the Cumulative Impact on GDP Growth

	E1	E2	E3	E4	E5	Avg(E1,E2)	Avg(E3, E4)
U.S.	-13.3	-11.8	-3.7	7.1	-1.8	-12.5	1.7
Euro12	-9.1	-2.9	1.0	-0.4	-1.4	-6.0	0.3
Japan	-16.1	-4.4	7.6	3.3	-1.0	-10.3	5.4

Oil Price Shock Episodes and the Change in Inflation

	E1	E2	E3	E4	E5	Avg(E1,E2)	Avg(E3, E4)
U.S.	4.9	4.0	1.7	-0.2	1.2	3.3	0.7
Euro12	4.3	2.7	1.3	-0.5	0.6	3.5	0.4
Japan	7.9	1.0	-1.7	0.9	0.6	4.4	-0.4

Note: episode 5 is based on author's preliminary estimates and is based on only 5 quarters of data.

The average impact on GDP growth and inflation was much larger in episodes 1 and 2 compared with the episodes 3 and 4. The cumulative impact on GDP growth was positive in the last two episodes and the impact on inflation was about one-fifth. However, in the most recent episode, E5, we observe that there has been a cumulative decline in GDP growth of almost 2% and increase in inflation of 1.2%. The current period of stagflation,

recession with inflation, while not over is consistent with the earlier episodes from the 1970s, but not as large quantitatively.

The most recent episode appears to suggest that large oil price increase and macroeconomic stagflation relationship has returned, but not as strong. Prior to the current episode, there have been four major hypotheses or explanations for the break down of the relationship.

The first argues that the impacts of oil prices on the economy are actually similar. But when combined with other negative shocks there appeared to be a stronger effect in the 1970s than warranted. Too much of the blame for economic downturns was attributed to oil price shocks.

The second explanation involves structural change in the economies. Labor markets have more flexible since the 1970s. (This may apply to other input markets for production.) This manifests itself through a decrease in real wage rigidities over time. When real wages are rigid, essentially fixed or not falling, there is a tradeoff between stabilization of inflation and the deviation of GDP from a full employment level of GDP or its natural level. There is a larger response in the economy to adverse supply shocks like increases in oil prices; inflation increases are bigger, output declines or slows down by more, and unemployment rises by more. If labor markets have become more flexible over time, the responses of inflation, output, and unemployment become smaller.

A third explanation involves the practice of monetary policy. In the two earlier episodes with the exception of Japan the central banks in OECD countries chose to use expansionary policy in response to the adverse supply shocks leading to higher inflation and little positive effect on the macroeconomic activity like GDP and unemployment. More recently, central banks like the Federal Reserve Board have chosen to make a stronger "pledge" to price or inflation targeting. This change in commitment and the credibility or expectation of follow through by the public may have contributed to the decline in negative effects of adverse supply shocks.

The final explanation argues that the energy intensity of GDP or production has fallen sufficiently to reduce the impact of oil price shocks. There has been a decline in the use of energy per unit of output. Modern economies have become more efficient in their consumption of energy. Thus large oil price increases do not have the same effects as before.

However, until the most recent episode, E5, these arguments may have had value in combination. But, over the past six months, macroeconomists and energy economists have argued that the large oil price increases, 200% since January 2007, have crossed a "threshold"[1] leading to a return in the stagflation result.

[1] There is no measure of the threshold. It is a concept related to the world oil market conditions.

The "threshold effect is not inconsistent with the four explanation. The macroeconomic response is smaller than before. It just takes larger oil price shocks to create negative impacts.

I address three of the energy specific facts. First, we will consider the energy intensity or efficiency issue. Then, we can discuss the recent increase in oil prices. Finally, we can look at the role of spending on oil and economic growth.

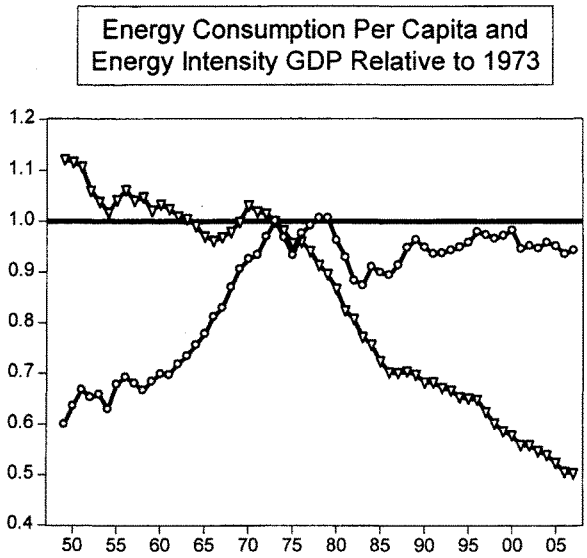
Energy Intensity or Efficiency

The US economy uses less oil (energy) per dollar of GDP in 2007 than it did in 1973. US consumers and firms have become more efficient in energy consumption. See figure 1. Relative to 1973, the quantity of energy used per dollar of GDP has fallen 50%.

However, since 1973 energy consumption per capita has stayed the same. Americans use the same amount of energy per person. It is just that technological change and conservation has allowed us to have a higher standard of living when it comes to energy.

Note, that in the 1950s we consumed one-third the amount of energy per person than we do in 2008 and about twenty-five percent more than in 1965.

Figure 1.



What has happened to the price of oil?

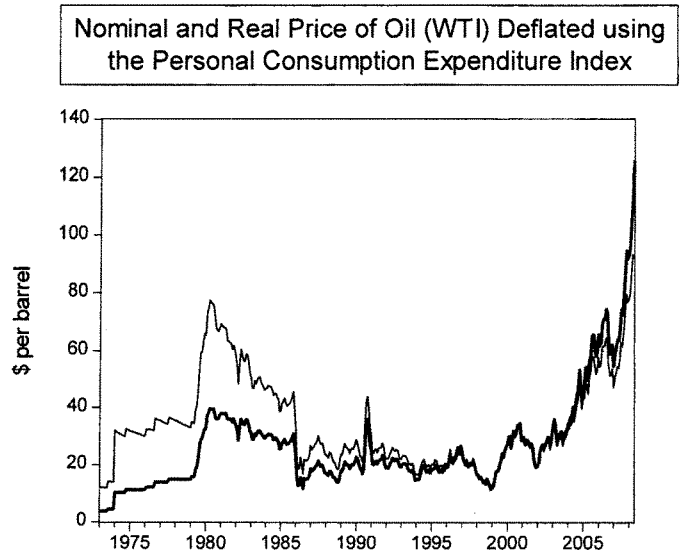
Oil prices have ranged between $10 / barrel and $135 / barrel since 1973. The first dramatic increase occurred at the end of that year associated with the Yom Kippur War. Prices more than doubled. Prices were stable about 1979 and the second major oil price shock when they more than doubled again to nearly $80 / dollars per barrel. Between 1985 and 2000, the nominal and real price of oil hovered at about $20 / barrel.

The real price of a barrel today is slightly higher than it was at its peak in 1980. It is about $79 / barrel in June of 2008 compared with $78 / barrel in March of 1980.

This is despite the fact that prices in general have risen 140% since 1980 using the personal consumption expenditure chain weighted deflator with 2000 as the base year.

Since then nominal price has risen more than 6-fold and the real price has increased more than 4-fold. Compared to the 1970s the oil price increases have been almost continuously upward. Whereas in the 1970s, the oil price increases happened relatively quickly.

Figure 2



Note: The nominal or current price is in blue and the real price is in red.

What has happened to the price of oil? (continued)

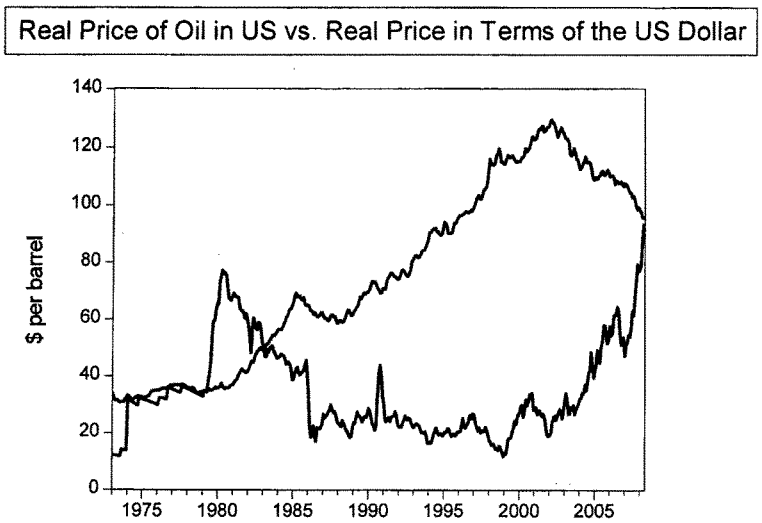
Since 2000 the real price[2] of oil per barrel has increased almost than 5-fold, from about $20 / barrel to nearly $100 / barrel.

Between 1985 and 2000 the real price of oil in the US hovered at about $20 / barrel.

However, the real price of oil has moved radically different when accounting for exchange rate movements. Between 1985 and 2000, the value of a US dollar on a trade weighted basis more than doubled. In effect, foreign importers of oil faced real price increases during this time. Similarly, the purchasing power of revenues per barrel declined for oil exporting countries by 50%.

The roles have reversed since 2002. The value of US dollar has depreciated; on a trade weighted basis it has declined by 25%. At about $100-$110 / barrel, the price is about the same for all consumers in the world.

Figure 3.



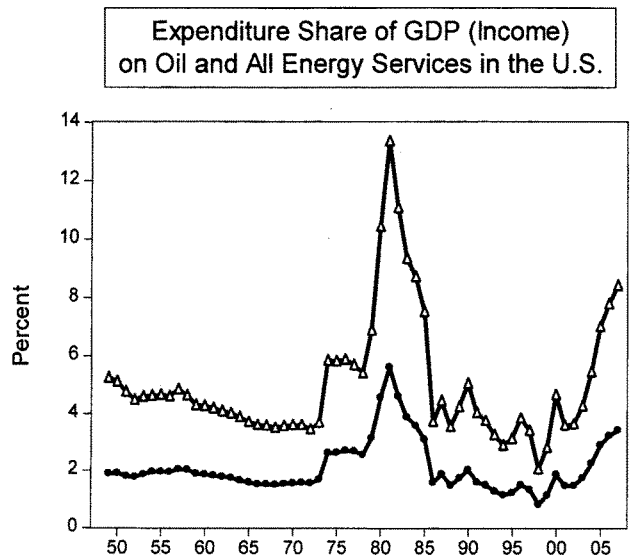
[2] The dollar price of a barrel of oil is deflated by the personal consumption expenditure chain weighted index in 2000. The real price in terms of the US dollar deflates the dollar price by international trade weighted measure of the dollar against foreign currencies.

A Look at Spending on Oil and Energy

The share of GDP spent on oil and on all energy has been about 2% and 4% respectively on average between 1950 and 2000. However, the first two major oil price episodes led to an increase in the expenditure share of both ultimately to 6% and 12% respectively. Between 1985 and 1998 the expenditure share was about 2% and 4% respectively for oil and all energy.

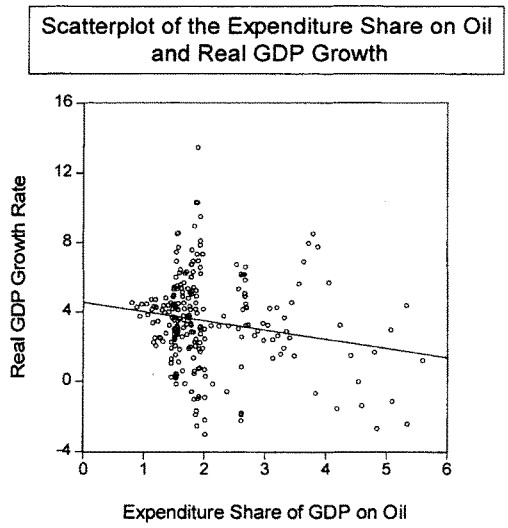
Currently the expenditure share of GDP on oil and energy is rising to the heights seen in 1980. Since 1998, the expenditure share of GDP for oil has more than tripled. This is attributed to higher oil prices. Since 1998, the expenditure share of GDP for all energy has quadrupled. This is due to a relative increase in the consumption of other energy sources and price increases in energy supplies across the board for natural gas and electricity.

Figure 4.



A Look at Spending on Oil and Energy

There appears to a simple negative relationship between how much is spent on petroleum products relative to income and real GDP growth. In a simple correlation sense it is -0.18. When expenditures to income are above average real GDP growth tends to be below average.



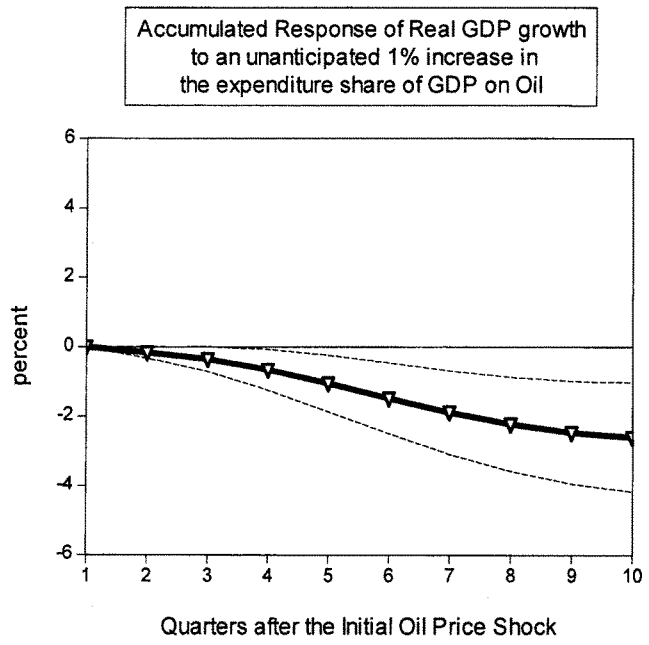
The scatter plot above does not take into account the dynamic relationship between the two measures. I estimate a simple bi-variate vector autoregression[3] using the expenditure share of GDP (income) on the growth rate of real GDP for the period 1950q4 through 2007q4. Table A.1presents the estimation results. Vector autoregressions are popular in applied macroeconomic research to learn about the dynamic interrelations between economic variables like oil prices, GDP growth, inflation, and employment. These models have contributed to our understanding of the interactions among macroeconomic variables. They permit macroeconomists to test for whether the past behavior of one series is a useful indicator in predicting future movements in other series through block exogeneity or Granger "causality" tests.

I found that past values of the expenditure share of GDP on oil helped to explain future growth rates of real GDP. The reverse was not true. Past values of economic growth do not help to explain the future budget share spent on oil. See Table A.2. In addition, I find

[3] The econometric models were estimated with a constant and 4 lags of each variable. Similar results are obtained with only 2 lags.

evidence similar to Blanchard and Gali. The impact appears to have diminished since 1983.

Another useful tool of the vector autoregression technique is the analysis of shocks of one variable on the future movements of other variables. These are sometimes referred to as structural vector autoregression models. The figure below illustrates the responsiveness of the real GDP growth rate following a one percent increase in the budget share of GDP spent on oil.



There is no immediate impact of the higher oil price. It takes about a year (4 quarters) for the impact to be significant and it continues through about 10 quarters.

Appendix A.

Results from the Vector Autoregression Model.

Other Estimates

Percentage Impact of a $10 Increase in the Price of Oil on Baseline Macroeconomic Projections

	Global Insight	U.S. Federal Reserve
	First Year	
Real GDP Growth	-0.3	-0.2
Inflation (GDP Deflator)	0.2	0.3
Unemployment Rate	0.1	0.1
	Second Year	
Real GDP Growth	-0.6	-0.4
Inflation (GDP Deflator)	0.5	0.3
Unemployment Rate	0.2	0.2

Source: EIA – 0383(2006)

Differences in U.S. Oil Price-GDP Elasticities to Higher Oil Prices and Oil Price Shocks

	Oil Price Increase	Oil Price Shock
	First Year	
Real GDP Growth	-0.011	-0.024
Inflation (GDP Deflator)	0.007	0.019
Unemployment Rate	0.004	0.009
	Second Year	
Real GDP Growth	-0.021	-0.05
Inflation (GDP Deflator)	0.017	0.034
Unemployment Rate	0.007	0.02

Source: EIA -0383(2006)

Do Adverse Oil Price Shocks Cause Recessions?

Let's begin our analysis by:

Looking at the issue from a micro perspective,

Considering a general equilibrium approach, and

Examining several short-run macro-models.

•

The Role of Energy in Production

Energy resources are an important input in the production of goods and services.

Consequently an increase in the price of energy will:

1. Raise total costs of an efficient producer's output
2. Alter the most efficient means of production
3. Lower the profit maximizing level of output
4. Raise the long-run equilibrium level of output
5. Cut the productive capacity of each firm's existing stock of capital

Capacity output declines because:

1. Higher energy prices reduce the quantity demanded of energy and energy using capital stock
2. Some capital becomes obsolete
3. Substitution towards labor and capital is not perfect 1:1

Changes in Firm Capacity affect the economy's natural rate of output and long-run aggregate supply
Energy Prices can have direct and indirect effects on production
Consider a 3-factor production function (Bohi, 1992)

(1) $Q = F(K, L, E)$

- Where Q is gross output

K is real capital inputs
L is labor inputs (hours)
E is energy inputs
Net Output is given by

(2) $Y = Q - PeE$

Where Pe is the relative price of energy (output is the numeraire)
Substitute the gross output equation (1) into net output (2)
Assume that the marginal product of each input is equal to the price

$dF(.) / dK = R$
$dF(.) / dL = W$

dF(.) / dE = Pe

Convert to natural logarithms
Take the derivative with respect to the price of energy

$$\frac{d\ln Y}{d\ln Pe} = \left[\frac{RK}{Y}\right]\frac{d\ln K}{d\ln Pe} + \left[\frac{WL}{Y}\right]\frac{d\ln L}{d\ln Pe} - \left[\frac{PeE}{Y}\right]$$

The impact of energy prices can be decomposed into
three terms.
The last term captures the direct effect
The first two terms capture indirect effects
The effects are determined by the cost share of each
in production and the substitution effect on the inputs
of the production technology

The last term captures the direct effect
Net output will fall in relation to energy's cost share
This is equal to the additional resources necessary to
pay for the (intermediate) energy inputs.

Net output will fall whether the additional costs are for
domestic energy resources or the purchase of imports.
The first two terms capture indirect effects
These reflect the capital-energy and labor-energy
substitution effects.
We need to distinguish between the short-run and long-run
In the long-run, we typically assume that inputs can be
substituted for one another.
The short-run impacts are subject to theoretical and empirical debate

Capital-Energy substitution is often argued to negative
by the *Capital Obsolescence Hypothesis*.

Part of the capital stock is rendered economically obsolete
following an energy price shock.

This causes a decline in the flow of capital services
and a decline in productivity and output.
Labor-Energy substitution is often argued to negative
by the *Sticky Wage Hypothesis*.

Labor markets are inefficient and do not clear.

Rigid or sticky wages force employers to cut the demand for labor following an energy price shock.

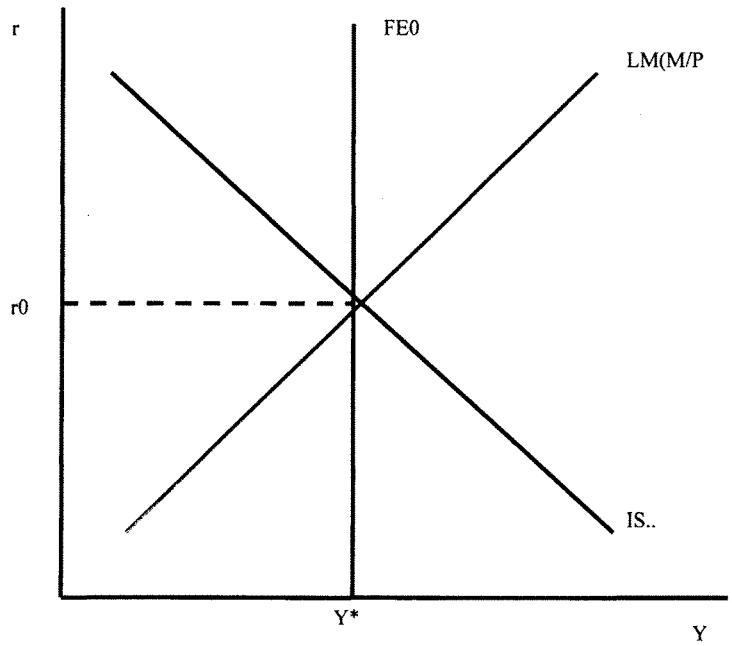
This causes a decline in the hours of labor services and a decline in output.

Use a general equilibrium framework for the complete IS-LM model

Combine labor markets, goods market and asset market equilibrium

General equilibrium occurs where the FE and IS curves intersect

Adjustments in the price level shift the LM curve to intersect where FE=IS



A Temporary Adverse Supply Shock

What is the impact of an unexpected increase in the price of energy on: output Y, the real wage W/P, the real interest rate r, employment L, unemployment UE, the price level P, the inflation rate π, consumption C, and investment expenditures I?

Define the production function as $Y = AF(K,L,E)$

If $Pe\Uparrow \Rightarrow A\Downarrow \Rightarrow MPL\Downarrow \Rightarrow L^{d}\Downarrow$

Assume that the shock is temporary; there is no effect on consumers' wealth or expectations about the real wage.

When $L^{d}\Downarrow \Rightarrow W/P\Downarrow \Rightarrow L\Downarrow \Rightarrow L^{*}\Downarrow \Rightarrow Y^{*}(FE)\Downarrow$
$K\Downarrow$

The natural rate or full employment line shifts to the left

Again the temporary assumption is that there is no effect on expected wealth, expected output, and the marginal product of capital

As FE shifts back we are moving along the IS curve

At the same time the shock has caused the inflation rate to increase
$\pi\Uparrow \Rightarrow P\Uparrow$ until the price shock begins to stabilize, then the inflation rate slows down
Energy Prices, the aggregate price level, and the inflation rate

Energy prices are direct component of the PPI and the CPI.

However, changes in energy prices feed into other producer and consumer prices indirectly.

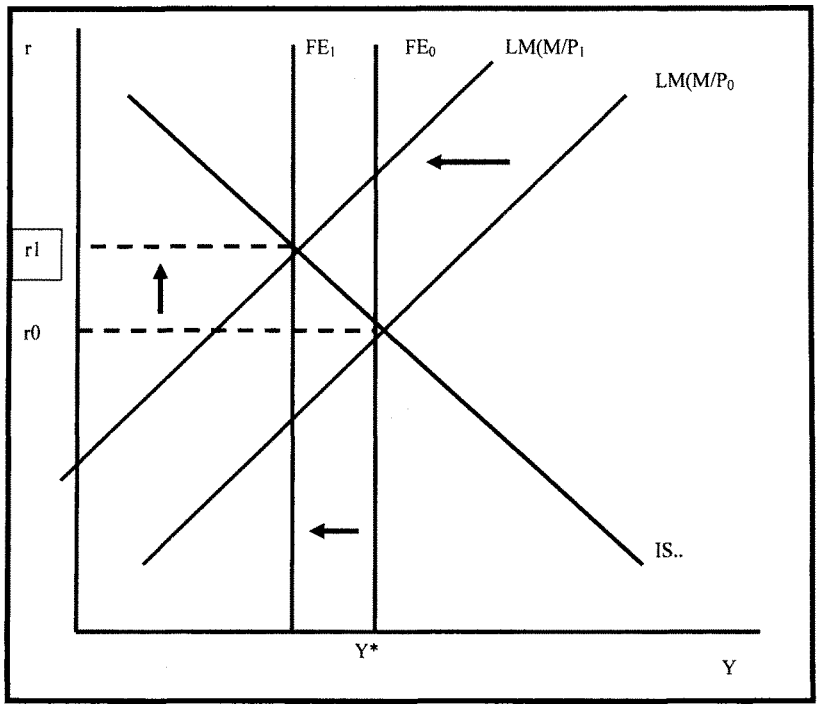
Core or headline inflation represents inflation excluding energy prices (and sometimes food)

When $P\Uparrow \Rightarrow$ real money supply falls, $M/P\Downarrow \Rightarrow$ the LM $\Downarrow$ or shifts left $\Rightarrow$ putting upward pressure on the (real) interest rate $r\Uparrow$

At the same time the shock has caused the inflation rate to increase

$\pi\Uparrow \Rightarrow P\Uparrow$ until the price shock begins to stabilize, then the inflation rate slows down and aggregate prices level off

$\Rightarrow$Output falls $Y\Downarrow \Rightarrow$ Consumption $\Downarrow$ and Investment expenditures $\Downarrow$


r
FE1
FE0
LM(M/P1
LM(M/P0
r1
r0
IS..
Y*
Y

Equilibrium in the AD-AS Model

Derive Aggregate Demand from IS-LM framework

IS: $Y = Y(r(i); G, T, Y^e, MPK^e, W^e)$

LM: $M/P = YL(i)$

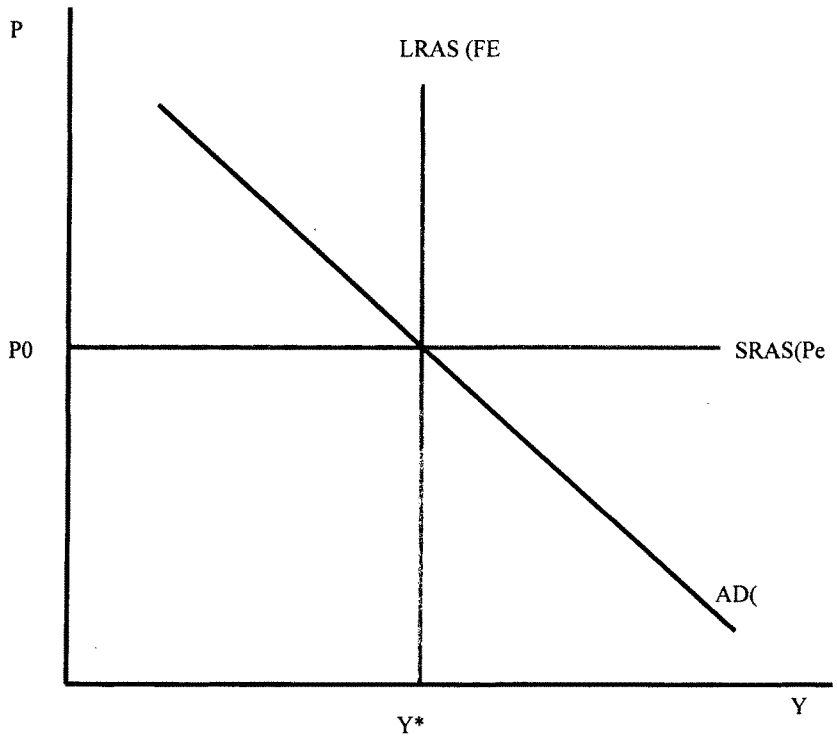
AD: $Y = Y^d(P; G, T, M, i, r, \pi, Y^e)$

Aggregate Supply

$Y = AF(K, L, E)$

Short Run Aggregate Supply

$SRAS = Ys(P; P^e, W, Pe)$



Stagflation

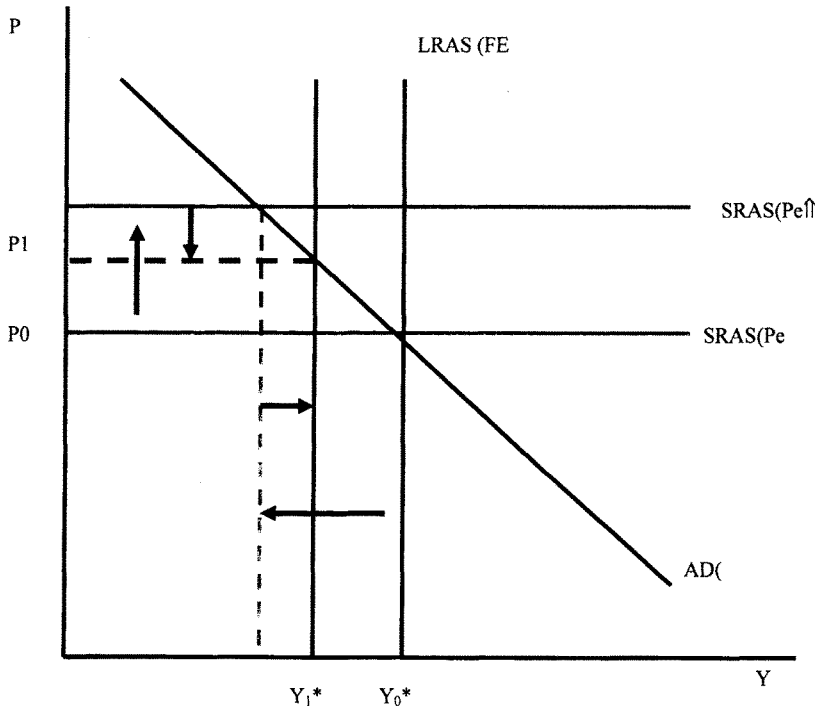
Term coined by Paul Samuelson in 1974.

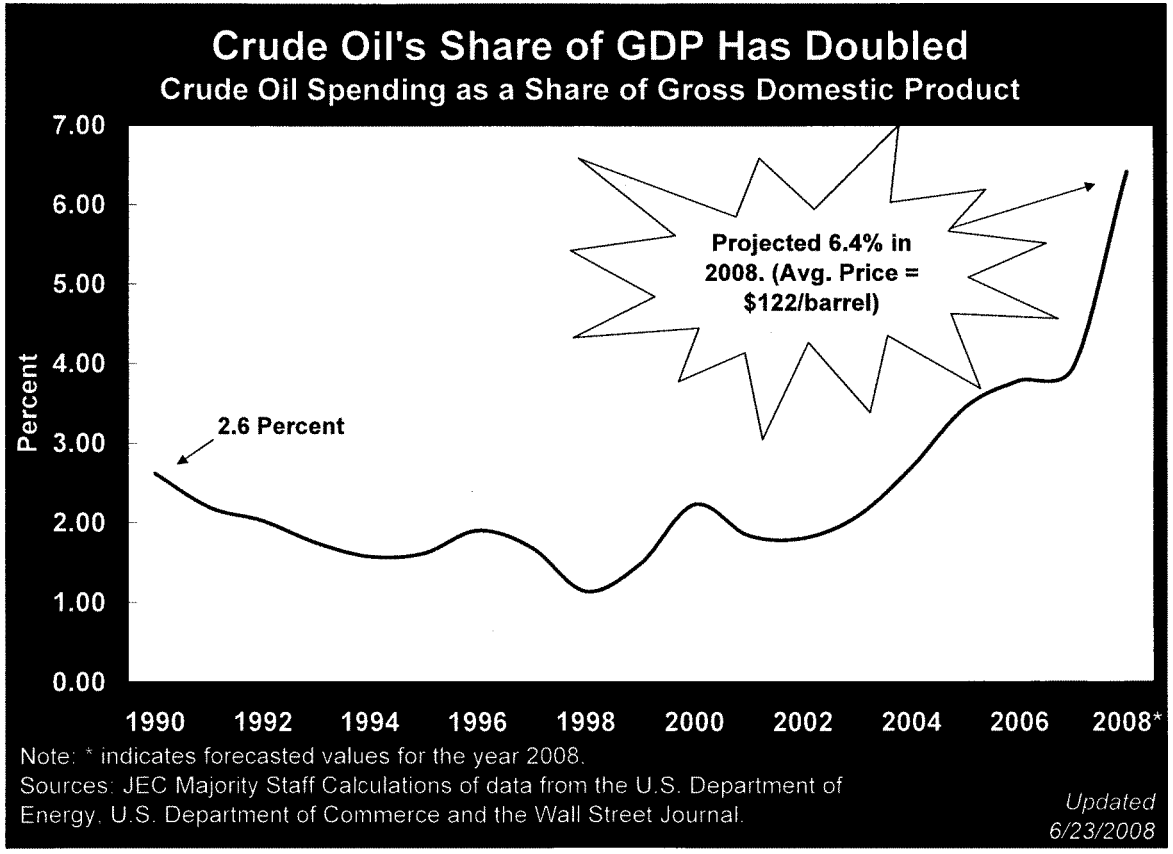
Adverse Aggregate Supply shock

Joint observation of increasing inflation and unemployment.

Counter to the basic Phillip's Curve concept relating UE and π

Many Economist ignored conditioning the relationship on other economic factors.




Crude Oil's Share of GDP Has Doubled
Crude Oil Spending as a Share of Gross Domestic Product
Percent
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008*
2.6 Percent
Projected 6.4% in 2008. (Avg. Price = $122/barrel)
Note: * indicates forecasted values for the year 2008.
Sources: JEC Majority Staff Calculations of data from the U.S. Department of Energy, U.S. Department of Commerce and the Wall Street Journal.
Updated 6/23/2008

Testimony of John A. "Skip" Laitner
Director of Economic Analysis
American Council for an Energy-Efficient Economy (ACEEE)

Before the Joint Economic Committee

A Hearing on

Oil Bubble or New Reality:
How Will Skyrocketing Oil Prices Affect the U.S. Economy?

June 25, 2008

Summary

This testimony responds to an invitation from the Joint Economic Committee to explore the economic potential of cost-effective investments in more energy-efficient technologies, especially as those investments favorably impact petroleum prices and improve the robustness of the American economy. As discussed in this testimony, there is a huge potential for cost-effective investments in energy efficiency: on the order of 46 billion barrels of oil equivalent between now and 2030. That magnitude of further gains in energy efficiency could generate a significant downward pressure on oil prices and increase both the resilience and robustness of the American and the international economies — if we choose to encourage those more productive investments.

Policy solutions will play a pivotal role in strengthening the continued development, dissemination, and widespread adoption of energy-efficient industrial and transportation technologies and systems. In that regard, ACEEE recommends 10 policy actions that might be undertaken by this Congress to immediately provide that signal, and more critically, to change the direction of energy usage through increased energy efficiency.

The set of 10 proposals offered here is intended to accomplish two specific objectives. The first is to provide an immediate catalyst by launching an effort over the next few months that can "save oil in a hurry." If undertaken with sufficient robustness, these initial proposals might generate an immediate downward pressure on oil prices to the benefit of consumers and businesses. The second is to begin the process of fundamentally restructuring our transportation infrastructure — a step that will be necessary if we are to change the energy use path that our transportation system is currently on. Many of these suggestions lay the groundwork for a shift in the larger transportation policy, an opportunity that is afforded the next Congress by next year's reauthorization of the transportation bill.

Introduction

My name is John A. "Skip" Laitner. I am the Director of Economic Analysis for the American Council for an Energy-Efficient Economy (ACEEE), a nonprofit organization dedicated to increasing energy efficiency as a means of promoting economic prosperity, energy security, and environmental protection. I am here today at the invitation of the Joint Economic Committee to explore the role of productive investments in more energy-efficient technologies, as well as energy conservation behaviors, as both might positively improve the robustness of the U.S. economy. I thank you for the opportunity to testify here today. Indeed, I applaud the Committee for its willingness to more closely examine (and hopefully act on) the potential contribution of energy efficiency as it strengthens the productivity of our economy. What might we conclude in this regard? As we shall see, there is a huge potential for cost-effective investments in energy efficiency: on the order of 46 billion barrels of oil equivalent between now and 2030. That magnitude of further gains in energy efficiency could generate a significant downward pressure on oil prices and increase both the resilience and robustness of the American and the international economies — if we choose to encourage those more productive investments.

Despite the potential for significant improvements in energy productivity, most of the current policy assessments and economic modeling exercises fail to adequately capture the ways in which individual or business energy consumption patterns might change in response to both economic and noneconomic policies and programs. Therefore, policy reviews that have been based on those kinds of assessments and models have consistently overlooked the energy saving benefits that can be achieved through changing social preferences, the accelerated adoption of energy-efficient technologies, and more energy-aware behaviors. As such, assessments have tended to underestimate the energy savings that can be achieved while generally overestimating the costs of achieving increased levels of energy efficiency and larger gains in energy productivity.

The inaccuracy of these past assessments has large and important implications for both energy and climate change mitigation policies. In the remainder of my testimony here today, I will expand on these notions as I try to answer three questions in response to the Committee's invitation:

1. What is the magnitude of recent gains in energy efficiency and how do they compare to ongoing investments in conventional energy resources? Perhaps more importantly, what might be the approximate scale of both near-term and mid-term efficiency opportunities? And especially, what might we say about opportunities for immediate reductions in the demand for petroleum resources in ways that enhance overall economic productivity?

2. What are the kinds of policies that might be encouraged to shape more productive behaviors and patterns of investments in cost-effective, more energy-efficient technologies?

3. Can we say anything about the economic returns associated with the accelerated adoption of energy-efficient technologies and more energy-aware behaviors?

In responding as fully as I can to each of these questions, let me divide up my remaining testimony into five major parts. The first section following this introduction provides an energy and economic context that I hope will be helpful in responding to the Committee's request. The next three sections will deal specifically with each of the questions posed — especially in the context of our transportation system and its potentially beneficial impacts on oil prices. The last section will provide a summary and conclusions.

Energy Consumption in Context

As one of the richest and more technologically advanced regions of the world, the United States has expanded its economic output by more than three-fold since 1970. Per capita incomes are also twice as large today compared to incomes in 1970. Notably, however, the demand for energy and power resources grew by only 50 percent during the same period.[1] This decoupling of economic growth and energy consumption is a function of increased energy productivity: in effect, the ability to do more with less consumption. In today's testimony I would like to reaffirm the compelling evidence that suggests that even greater energy productivity gains can be achieved. At the same time, the evidence suggests that there is significant room for improvement in the policies that shape our demand for energy. In short, there is good news in all of this; but as we shall see, there is also some serious work ahead.

The Success of Energy Efficiency to Date

The members of this Committee may be surprised to learn how big a role energy efficiency has already played supporting the growth of our economy over time. In the figure shown on the following page, we examine the historical context of efficiency gains estimated through 2008 as they might compare to the development of new energy supplies since 1970. In effect, the figure compares the projected level of energy consumption in 2008 to that which might have been necessary had the economy continued to rely on 1970 technologies and market structure.[2]

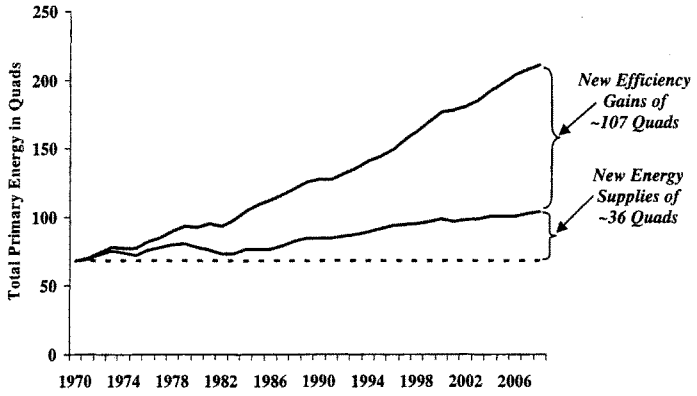
In 1970 Americans consumed an estimated 68 quadrillion Btus (quads) for all uses of energy — whether heating and cooling our homes, schools, and businesses; powering our many industrial processes; or transporting both people and freight to the various places they needed to go. If we converted all forms of energy consumed in 1970 to an equivalent gallon of gasoline, it turns out

[1] These and other specific energy-related data cited in the testimony are the author's calculations as they are drawn from the Energy Information Administration's *Annual Energy Review 2007*, Report No. DOE/EIA-0384(2007), Washington, DC: U.S. Department of Energy, June 2007; and Energy Information Administration's *Short-Term Energy Outlook — June 2008*, Washington, DC: U.S. Department of Energy.

[2] Strictly speaking, the term energy efficiency as used here today can be more broadly defined as a reduction in energy intensity; that is, a reduction in the number of Btus needed to support a dollar of economic activity. This change results from two key drivers. This first is a change in market structure as we move away from energy intensive industries as a source of income to higher value-added services. The second is what we typically think of as energy efficiency — more efficient lighting and consumer products, greater fuel economy in our vehicles, and more efficient power plants and industrial processes. The United States has benefited from both economic drivers; and both were made possible by a combination of behaviors, innovations, and productive technology investments. From a macroeconomic perspective the evidence suggests that anything we can do that positively reduces energy use while maintaining incomes and economic prosperity can be termed "energy efficiency." It is in that larger sense that I use the term here today.

that the U.S. economy required about 2,700 gallons of gasoline equivalent for each man, woman, and child living in the U.S. at that time. Had the United States continued to rely on 1970 market structure and technologies to maintain its economic growth, we would today be consuming an estimated 211 quads of energy. That would have been about 5,500 gallons of gasoline per person equivalent. But in fact, the consumption estimated for 2008 appears to be just under 104 quads of energy (in rounded numbers). Again on a per capita equivalent, this means that the U.S. economy still requires no more than about 2,700 gallons of gasoline per resident.

U.S. Energy Service Demands, Energy Efficiency Gains, and Energy Supplies, 1970-2008



Source: Author calculations based on EIA data referenced in footnote 1.

In examining these numbers more closely, several insights might pop into mind. First, energy efficiency has allowed us to hold per capita energy use to about the same level we used in 1970 while still enjoying an expanded set of goods and services. Second, instead of doubling our energy use with the expanded economy, in effect, the gains in energy efficiency have allowed us to reduce total energy use by the equivalent of 107 quadrillion Btus in 2008, relative to what our energy use would have been absent those efficiency gains. As such, energy efficiency has "fueled" roughly 75 percent of the new growth demands in the United States since 1970. The new conventional energy resources, on the other hand, have provided only one-fourth of the demands (or about 36 Quads, as shown in the above figure). In fact, energy efficiency may be the farthest-reaching, least-polluting, and fastest-growing U.S. energy success story of the last 50 years. It is also the most invisible, the least understood, and in serious danger of missing out on needed future investments.

In a report published only last month, ACEEE noted that in 2004 the U.S. invested an estimated $300 billion in energy efficiency (Ehrhardt-Martinez and Laitner 2008). This was about three times the amount invested in traditional energy infrastructure, whether power plants or oil and gas wells. Those energy productivity investments are estimated to have generated approximately 1.7 quads of energy savings in 2004 alone — roughly the equivalent of the energy required to

operate 40 mid-sized coal-fired or nuclear power plants. Yet the analysis suggests that the many contributions of energy efficiency often remain invisible and go unrecognized. The report also notes that although efficiency is a proven resource, it remains seriously underdeveloped. In other words, there are substantially further gains that might be available if we pick up the pace of efficiency investments.

The Magnitude of Future Efficiency Potential

American economist Kenneth Boulding once commented that "Images of the future are critical to choice oriented behavior." In effect, Boulding was suggesting that unless we are able to visualize future opportunities, we are less likely to realize their full potential. In that same spirit, therefore, ACEEE believes it is important to visualize the larger potential of energy efficiency to enable the development of policies and technologies that might enhance our overall energy productivity. While our preliminary assessment indicates that the efficiency market is already large, the more important questions are how large can the market ultimately be, and how rapidly can it be developed?

The recent United Nations Foundation study called energy efficiency both the largest and least expensive energy resource, suggesting that the G-8 and other nations could double historical rates of efficiency improvement by 2030 (Expert Panel on Energy Efficiency 2007). If the United States were to follow that course — and other ACEEE studies suggest this can be a cost-effective policy path, U.S. energy consumption in 2030 could be reduced to the level of energy consumed in the years 1996-1997. Assuming that policies, market forces, and new financing mechanisms facilitate substantial investments in energy productivity, we might have an economy in the year 2030 that is about 70 percent larger than it is today, but one that uses no more energy than was required in the mid-1990s.[3] That would be a clear benefit for consumers, for business, and for the global climate. But, again, this would be the outcome only if we choose to develop that more productive investment path. And that is the huge task ahead. . . .

[3] In December 2007 the Energy Information Administration's forecast, the *Annual Energy Review 2008* indicated that energy consumption would increase to about 124 quads by 2030. With the passage of the Energy Bill by Congress earlier this year, EIA subsequently revised its forecast to 118 quads by 2030. Building on that trend, an additional 20 percent savings by 2030 would imply a total energy use in a high-efficiency scenario would be on the order of 94.4 quads. EIA data suggests that actual energy use was about 94.2 quads in 1996. The difference between those projected values (i.e., 118 quads in the reference case versus 94.6 quads in the energy productivity case) is 23.6 quads. The cumulative savings over the 2008 through 2030 time horizon would be just under 269 quads compared to the reference case consumption pattern. With each barrel of oil equal to 5.8 million Btus, this level of savings is comparable to 46 billion barrels of energy efficiency equivalent. This is the figure cited at the beginning of this testimony. This comparative scenario analysis draws on a study and modeling analysis by Laitner et al. (2006).

Understanding the Transportation System

With this hearing focusing more specifically on oil prices, let me now highlight the efficiency potential within the transportation sector; and more specifically the implications for petroleum consumption.[4] When we climb into our cars or other vehicles to get where we want to go, we're really climbing aboard an incredibly extensive and highly diverse transportation system. It involves the obvious things like roads, bridges, tractor trailers and shipping containers, but it also includes a much larger array of elements — each with inefficiencies that if corrected, or even changed in reasonably minor ways, can help reduce the need for gasoline and other petroleum products. Among the less obvious aspects of the transportation system are traffic signals and controls, information and enforcement activities, and the scheduling, coordination, and management of facilities, goods, and services. Perhaps even less obvious is all the freight that must be hauled — to get the food from the farm to the processing plant and then to the grocery store; to get the lumber from the forests to the mills, from the mills to the lumber yards, and finally to our homes and offices; or to get the clothing, medicines, books, and consumer electronics to the stores for purchase by consumers and businesses.

Adding up all the energy required by these various transportation needs, it appears that we need about 14.7 million barrels of oil each day to maintain current levels of use (and inefficiencies). Cars and other light duty vehicles demand 9.2 million barrels per day, or about 63 percent of the total. While the average fuel economy for automobiles has grown from 13 miles per gallon in 1973 compared to perhaps 23 miles per gallon today[5] — a respectable 70 percent over that period — there are more and more cars which are driving more and more miles. The end result is that we are using more and more gasoline and other petroleum fuels. And the kinds of cars we are driving have also changed. In the mid-1970s only one out of five new light-duty vehicles sold was a pickup or other light truck. Today trucks, sport utility vehicles and minivans comprise nearly half of the total sales for new light duty vehicles (Davis and Diegel 2007). Their overall fuel economy is substantially less at 17.7 miles per gallon. As a result, all the gains in fuel efficiency have been eaten away by horsepower wars and the growing sales of less-efficient trucks, minivans, and SUVs. The result is an average fuel economy of 20.3 miles per gallon for all light-duty vehicles on the road today (EIA 2008).

There is some good news in this. Whether we are talking about passenger cars, railroad trains, trucks, aircraft or ships, over the next twenty years the potential for technology improvements that increase the fuel efficiency of individual vehicles is significantly greater than is generally imagined or appreciated. But an even larger "system gain" in energy efficiency is possible if we make wholly achievable cost-effective improvements in system operations, in infrastructure and in land use patterns –in addition to those vehicle efficiency improvements.

[4] This section of the testimony draws heavily on a report released earlier this year through the Civil Society Institute (Laitner 2007).

[5] I might note that all of the gains in fuel economy occurred over the period 1975-1986, and that today new vehicles are still below the average reached in 1986.

The Many Efficiency Opportunities in Transportation

To gain some insight into the full opportunity for system efficiency improvements, let's start with the more familiar area of vehicle efficiency improvements. Even a cursory look at the "Best of 2008" cars makes it clear that gains in energy efficiency come from a wide range of technologies. Hybrid vehicles such as the Toyota Prius or the Honda Insight have been claiming the limelight when it comes to high miles-per-gallon vehicles, but fuel-efficient technologies are also being installed in more conventional cars as well. Intelligent engines with features such as cylinder deactivation, turbocharging, direct injection, and variable valve control; advanced transmissions, including 6-7 speed automatics or continuously variable transmissions (CVTs); and lightweight materials, engine-off-at-idle, friction reduction, and improved aerodynamic designs all do their part to help make these cars more energy-efficient. By extending these and other technologies to include more of the new car and new truck fleet (in effect, so that the best becomes the typical), there is a huge potential to improve the energy efficiency of conventional vehicle technology (IEA, 2005). A recent report of technology experts funded by the United Nations Foundation called for a 35 percent increase in fuel economy by 2020 and a 60 percent increase by 2030 for new light-duty vehicles (Expert Group on Energy Efficiency 2007).

These advanced technologies admittedly increase the manufacturing costs of vehicles but at the same time they also reduce the energy costs of operating them. DeCicco et al. (2001), for example, suggested that fuel economy standards could increase from 37 to 70 percent over a 15 year period with no more than a 4.5 to 6.6 percent increase in costs. In other words, a car that might cost an additional $1200 might also save 150 gallons of gasoline annually. With current gasoline prices in the range of $4 per gallon, this might imply a typical payback of two years. Similarly, a car that might cost an extra $3000 might save 190 gallons of gasoline which means that at $4 per gallon, the extra investment would pay for itself in about four years. Although a shorter payback period would be better, either of the technology upgrades would generate a positive return for a vehicle with an expected life of 17 years or more. Perhaps even more impressive and more recently, the California Air Resources Board estimates that meeting California tailpipe standards (which will result in vehicles that reach roughly 35 mpg in 2016) will cost on average $1000 per vehicle. At $4 per gallon of gasoline, this will save about $700 per vehicle per year, yielding a 1.5 year payback. (For other comparative estimates of costs and savings associated with vehicle efficiencies, see IEA 2006, tables 5.2 and 5.6; and Vattenfall 2007.)

At the same time, the actual fuel economy that is achieved while driving those motor vehicles can be greatly affected by how they are operated and how they are maintained. Whether in the form of speeding and aggressive driving, excessive engine idling, improper tire pressure, and even poor choice of motor oil, the behavior and maintenance decisions of drivers can also affect the on-road fuel economy. One recent study concluded that programs which promote improvements in driving style through training and technology aids could generate a 10 percent reduction in typical fuel consumption and therefore in greenhouse gas emissions (ECMT/IEA 2004).

Even though automobiles now use about two-thirds of the transportation fuel consumed in the United States, large savings are also possible in the movement of freight as well as the

movement of passengers in business, air, and train travel. One professor of transportation logistics has suggested that heavy trucks might save 32 percent of energy use through a combination of improved fuel efficiencies, and better coordination to reduce empty backhauls and unnecessary travel (McKinnon 2007). Still another ACEEE study lists tractor-trailer technologies that can reduce fuel consumption by 39 percent across the fleet of those heavy duty vehicles. The paper as a whole shows the potential to reduce oil consumption through efficiency gains across many different sectors (See Elliott et al. 2006, especially Tables 10 and 11). Although rail transport is one of the more energy-efficient transportation modes, the IPCC suggests that substantial opportunities for further efficiency improvements remain. These include reduced aerodynamic drag, lower train weight, regenerative breaking and higher efficiency propulsion systems, all of which can make significant reductions in rail energy use. While passenger jet aircraft produced today are 70 percent more fuel efficient than equivalent aircraft produced 40 years ago, the IPCC notes that a 20 percent improvement over 1997 aircraft efficiency is likely by 2015 and "possibly 40 to 50% improvement is anticipated by 2050. Still greater efficiency gains will depend on the potential of novel designs such as the blended wing body, or propulsion systems such as the unducted turbofan" (Kahn et al. 2007).

Emergence of Information Technologies

One especially interesting opportunity that is emerging is the use of broadband and information and communication technologies (ICT) to increase transportation efficiencies by decreasing travel demands and increasing transportation system efficiencies (Laitner and Ehrhardt-Martinez 2008). A new study released just last week by the Climate Group (2008), with assistance from McKinsey and Company and on behalf of the Global e-Sustainability Initiative (GeSI), found that ICT has the potential of reducing energy-related global greenhouse gas emissions by 15 percent by 2020 through a combination of smart buildings and smart grids and also smart transportation and travel reduction/dematerialization.

Smart vehicle technologies, for example, provide a range of innovative means for reducing transportation-related energy consumption while maintaining the services on which we depend. Vehicles are increasingly integrating sophisticated communications and information technologies that collect and communicate information regarding vehicle performance, routes and maps, road and traffic conditions, energy consumption, and environmental variables. As more and more vehicle manufacturers integrate on-board wireless technology, smart cars will increasingly be able to communicate with regional data centers as well as other vehicles on the road to share road data, travel information, traffic conditions, and other information. Moreover, on-board display devices will make this information readily accessible to drivers through the use of networks of sensors and communications devices. Maximum energy-efficiency gains can be provided through a combination of intelligent transportation systems (ITS) and smart vehicle systems that rely on a variety of sophisticated electronic technologies including GPS, sensors, processors and on-board communications equipment. In the future, these technologies will enable automated management of traffic flows, allow drivers to avoid congested roads, and locate and map the shortest routes to specified destinations — resulting in shortened drive times, reduced energy consumption, and lower greenhouse gas emissions.

Governments and businesses are also looking to integrate high-tech supply chain logistics and warehousing technologies. Advanced logistics technologies can help companies reduce fuel use, costs, and carbon emissions through:

- Intermodal shipping strategies that utilize a variety of shipping modes including rail resulting in reduced traffic congestion and idling time and increased shipping mode flexibility allowing shippers to choose the most fuel-efficient, cost-effective, reliable and timely mode of transportation.

- Improved truck tracking and logistics management to improve scheduling the pickup and delivery of goods so as to reduce wait times, maximize the size of truck loads, and reduce the number of wasted "backhaul" of empty trailers.

- Improved routing of traffic by providing real-time information about the quickest routes to reduce travel time and idling.

- Improved tracking and management of store and warehouse inventories to improve the management and flow of goods and increase the viability of intermodal shipping opportunities.

These strategies can minimize inefficient freight operations, saving fuel, increasing revenue for trucking companies, and reducing carbon dioxide emissions. For example, according to the US Environmental Protection Agency, the use of intermodal shipping for long distance shipments (over 1000 miles) cuts fuel use and greenhouse gas emissions by 65 percent, relative to truck transport alone (EPA 2004).

Still another transportation option is the use of telecommuting and videoconferencing. The emergence of information and communication technologies enables high quality work to be completed from a home office location in a way that saves gasoline — even after other energy uses are considered. For example, while a telecommuter may save gasoline as a result of a net reduction in commuter travel, there is some increased energy use associated with working in the home office. But even with a full accounting of those increased uses, a new estimate by the Consumer Electronics Association indicates that the regular telecommuting of some 4 million workers is now saving an estimated 840 million gallons of gasoline equivalent. More critically, the report suggests that the potential could grow to 25 or even 50 million workers which would significant increase current levels of energy savings (TIAX LLC 2007). By the time we include other ICT-enabled services ranging from expanded videoconferencing to increased electronic banking and other retail and entertainment services, the suggestion is that "normal" transportation efficiency gains could be greatly complemented by new patterns of working and living enabled by information and communication technologies.

The Need for a New Policy Framework

Even with all this good news about the potential for greater system efficiencies, however, transportation energy use is likely to increase by another 16 percent between now and 2030 — in the absence of additional policy intervention that might otherwise guide an optimal mix of technology improvements and new services demands.[6] This result is driven, in large part, by an increase in vehicle and air miles traveled. Despite the run up in oil prices, the Energy Information Administration estimates that travel demands may double the rate of growth of our population more generally over that same period of time (EIA 2008). One significant downside of the continued demand for petroleum resources is that this will likely push even harder on the rising energy prices faced by businesses and consumers. That same growth in energy use will also increase the burden associated with continued emissions of greenhouse gases.

A more successful outcome, one that achieves an optimal configuration of transportation technology systems, will require smartly crafted policy solutions to overcome important social, economic and structural barriers. Yet, at a recent transportation policy forum sponsored by the U.S. General Accounting Office (described as the audit, evaluation, and investigative arm of the United States Congress), participants said that "the nation's transportation policy has lost focus and that the nation's overall transportation goals need to be better defined." They further noted that "the federal share of total transportation spending continues to decline" (U.S. Controller General 2007). The evidence certainly seems to point in that direction.

Despite the availability of highly cost-effective measures to substantially raise fuel economy standards for both cars and heavy trucks at least since the early 1980s, we have not done so until very late last year. The Energy Independence and Security Act (EISA) enacted by Congress in December 2007, among other things, will increase the average fuel economy of new cars and light trucks combined from 25 to 35 miles per gallon by 2020. This is a positive step that will increase the average fuel economy of our national fleet of cars and light trucks over time. Unfortunately, this modest gain in average fuel economy is unlikely to offset the growth in overall travel within the United States. A more realistic focus on both climate change and world energy policies will require a more aggressive improvement in our system-wide energy and transportation efficiencies. Hence, a meaningful set of long-term policies should address an even greater level of fuel economy improvements, as well as significantly reducing overall travel demands, while maintaining a higher quality of life.

Following the recommendations of the United Nations Foundation panel of experts, for instance, a longer-term focus would increase fuel economy standards for light cars, trucks and heavy duty freight vehicles by at least 60 percent by the year 2030. There is an emerging consensus that — with the right set of policies, and with further investment in research and development activities directed toward transportation systems — a 60 percent improvement is still an economically achievable target (Expert Group on Energy Efficiency 2007; and Langer 2007). At the same

[6] It's worth noting that before passage of the Energy Independence and Security Act (EISA) in December 2007, the Energy Information Administration projected a 28 percent growth in transportation energy between 2008 and 2030. With the anticipated improvements in fuel economy under EISA, as well as a somewhat slower economy coupled with significantly higher energy prices, EIA has moderated that growth to only 16 percent as noted above.

time there should also be an emphasis on reducing the demand for travel through a combination of funding for alternative transportation systems as well as changes in land use and economic development policies.

Initial thinking suggests that, with supportive policies, a 20 percent (or greater) reduction in total vehicle travel might be possible by the year 2030 (Ewing et al. 2007 and Langer 2007). Alternative transportation technologies would include rail and mass transit systems as well as a greater emphasis on improving the logistics of freight shipments. Both approaches would either reduce travel or encourage the use of more fuel efficient modes of transport (e.g., piggybacking truck shipments with rail transport). A smarter transportation policy would also embrace greater reliance on telecommuting and videconferencing in ways that reduce both automobile and air travel. Economic development and land use policies might encourage production technologies that can be located closer to where new goods and services are actually needed. In this way travel demands can be reduced even further (Laitner and Ehrhardt-Martinez 2008, and The Climate Group 2008).

Policy solutions will play a pivotal role in strengthening the continued development, dissemination, and widespread adoption of energy-efficient transportation technologies and systems. Without a sensible framework of policy objectives and targets, the unfolding of these many technologies and their efficiency gains might follow any number of less productive paths.

Specific Policy Recommendations

At a minimum, the market needs a strong, clear, and persistent signal to help it organize and direct its own efforts and resources toward a more productive pattern of economic activity. To that end, ACEEE therefore suggests the following 10 policy actions that might be undertaken by this Congress to immediately provide that signal, and more critically, to change the direction of energy usage through increased energy efficiency. These proposals are intended to accomplish two specific objectives. The first is to create an immediate catalyst by launching an effort over the next few months which can "save oil in a hurry."[7] If undertaken with sufficient robustness, these initial proposals might generate an immediate downward pressure on oil prices to the benefit of consumers and businesses. The second is begin the process of fundamentally restructuring our transportation infrastructure — a step that will be necessary if we are change the energy use path that our transportation system is currently on. Many of these suggestions lay the groundwork for a shift in transportation policy that is afforded the next Congress by next year's reauthorization of the transportation bill.

1. Enact an Immediate Joint Resolution.

An immediate joint resolution, quickly followed by the other policy actions described below, would send a clear and strong signal to consumers, businesses, and the energy market in ways

[7] In fact, this phrase references a 2005 workshop convened by the International Energy Agency and a resulting book by that same name. The book identified a series of immediate measures that might save up to 1.7 million barrels of oil per day, at a cost ranging from $1 to $100 per barrel, if such measures were implemented by all members of the IEA. (2005). This effort might provide an immediate model of effort for the U.S. as well

that would help organize a more productive pattern of economic activity. The resolution should affirm the nation's energy efficiency potential and direct all agencies to immediately implement all cost-effective gains in energy efficiency — consistent with their current authority and funding.

2. Enact Emergency Transit Supplemental Funding.

Mass transit represents one of the few short-term alternatives to driving personal vehicles for many consumers, and we have seen recent surges in rider-ship since gas prices have surged. However, many transit agencies are struggling to close budget gaps created by dramatic increases in fuel, forcing them to curtail service at the time when demand is on the increase. The congress should pass an emergency funding supplemental to assist transit agencies with meeting their increased fuel bills, and make available funds at 80 percent federal match to supplement local and state investments in expanded capacity.

3. Establish a Crusher Credit for Inefficient Low-Mileage Cars.

This provision would accelerate retirement of the most fuel-inefficient and polluting light trucks when coupled with additional incentives for clean and efficient new vehicles. Under rules to be issued by the Secretary of the Treasury, owners of vehicles presented for destruction (crushing, shredding) will receive a voucher redeemable upon the purchase of a new vehicle meeting the eligibility requirements of the Alternative Motor Vehicle Credit contained in the Energy Policy Act of 2005. The recommended offset for the cost of the program is the extension of the federal "Gas Guzzler Tax", currently applicable only to passenger cars, to light trucks, at a level sufficient to fully offset anticipated program costs.

4. National Telecommuting and Videoconferencing Initiative.

Direct the appropriate agencies to immediately launch a campaign to encourage and enable immediate cost-effective telecommuting and videoconferencing. In addition, all federal agencies should be directed to establish telecommuting and videoconferencing to the maximum extent possible.

5. Develop Policies to Expand Alternative Modes of Freight Movement.

In preparation for next year's Transportation Bill reauthorization, Congress should commission a study of the potential fuel savings potential of expanding alternative mode of freight movement and identify policies that could be implemented to realize these savings

6. Co-Funding of Local Land Use Planning.

Congress should establish a program to co-fund local governments' efforts to update zoning and land use regulations in such a way as to encourage compact development compatible with transit service.

7. Study of Role of Information and Communications Technologies in Improving Transportation System Efficiency.

Direct the National Academies to undertake a study into role that Information and Communication Technologies (ICT) could have in reducing travel delays and improving the efficiency of transportation infrastructure.

8. Establish a National Energy-Efficient Driver Education Program.

To improve the efficiency of new drivers, it will be critical to change behavior. Congress should direct the Department of Transportation to develop information regarding driving practices, car maintenance, and fuel efficiency that can be incorporated into driver education programs.

9. Direct the Collection of Energy Efficiency Data and Indicators.

The role of energy efficiency is largely invisible in the US economy. Congress should direct and fund the Department of Commerce, Department of Energy and Environmental Protection (among others) to collaborate in the development of a National Energy Efficiency Data Center (NEEDC). The purpose of this new center will be to collect, organize, disseminate and archive energy efficiency and social science statistics and technology costs, particularly those related to public policies and programs.

10. Explore Other Incentive Mechanisms.

The Automotive X Prize is a $10 million inducement price and was announced in March of 2008. It is sponsored by the X Prize Foundation and Progressive Insurance. The prizes will be awarded to teams with cars that can win a staged race while maintaining a fuel efficiency rating of 100 miles per gallon and better.[8] In that same spirit Congress might direct appropriate agencies to explore ways to complement this initiative, but also to look for other inducements and prize incentives (both within and outside of government) which might encourage a more entrepreneurial and smarter use of our investment and energy resources across the many dimensions of our economy.

Likely Economic Returns

At this point we might ask how all of these energy efficiency policies, behaviors and investment decisions could reduce the economic damage of high fuel prices. Generally energy efficiency reduces the toll taken by high energy prices in two ways: first, by reducing consumption, and therefore the amount of energy for which consumers must pay; and second, by reducing prices. As but one example of the possible impacts, ACEEE estimates that the U.S. could reduce oil consumption by 9-13% by 2015 and 15-21% by 2020 through energy efficiency (Elliott et al. 2006). The measures to accomplish this are all cost-effective; that is, the efficiency improvements typically cost less than half what they save in petroleum costs. With regard to

[8] The X PRIZE Foundation, best known for the successful $10 million Ansari X PRIZE for private suborbital spaceflight, is an educational nonprofit whose mission is to bring about radical breakthroughs for the benefit of humanity by holding $10 million dollar (or larger) competitions to solve some of the world's greatest challenges." See, http://www.progressiveautoxprize.org/.

price reduction, the complex and global nature of oil and petroleum markets makes predicting price nearly impossible. We can nonetheless be confident that by giving the market a greater ability to respond to the price signal and by increasing the supply margin, energy efficiency can only help to relieve the run-up in prices. To the extent that speculation in futures markets is responsible for high prices, the adoption of policies that cost-effectively ease inefficient consumption in the near term will serve to combat these rising price effects.

Drawing on a broader variety of related studies and assessments, we can say that as long as such energy efficiency investments are cost-effective — in effect, investments that pay for themselves over a 3-7 year period — the economy should be strengthened. This point was reinforced by another new study released by ACEEE earlier this month (Laitner and McKinney 2008). This latest report, *Positive Returns: State Energy-Efficiency Analyses Can Inform U.S. Energy Policy Assessments*, concluded that energy efficiency investments are likely to stimulate a small but net positive benefit for the American economy. The report's conclusions were drawn from a review of approximately four dozen state- and regional-level efficiency potential studies that were undertaken over the past 16 years. Overall, the studies demonstrate the potential for an average of 23 percent efficiency gain with a nearly 2 to 1 benefit-cost ratio. Moreover, they suggest that a 20 percent additional gain in energy efficiency by 2030 could provide an estimated 800,000 net jobs while a 30 percent efficiency improvement might generate as many as 1.3 million net jobs. Finally, the report notes that efficiency-led policies that emphasize greater energy productivity are likely expand the nation's economy (as measured by our Gross Domestic Product, or GDP) by about 0.1 percent by 2030.[9]

Conclusions

Given the full array of evidence, we can conclude that energy efficiency can provide a significantly large contribution toward stabilizing energy prices and strengthening the robustness of the U.S. economy. The good news is that there are large opportunities to promote an even greater level of productive investments in energy-efficient technologies — should we choose to develop and purse those options. Policy solutions will play a pivotal role in strengthening the continued development, dissemination, and widespread adoption of energy-efficient transportation technologies and systems. The more quickly we act, the more quickly the benefits can accrue to both consumers and businesses.

[9] This result might make more sense when we realize that energy-related sectors of the economy contribute a significantly smaller rate of value-added per dollar of revenue received that almost all other sectors of the economy. Based on 2006 economic data for the U.S. economy, energy-related sectors contributed about 43 cents of value-added per dollar of revenue while all other sectors contributed about 54 cents per dollar of revenue. The same is also true for employment. Energy-related sectors of the economy support less that two jobs per million dollars of revenue while all other sectors support an average of seven jobs (IMPLAN 2008). The recent run-up in oil prices greatly lessens the rate of contribution the energy-related sectors provide the nation's economy, especially as those energy dollars pull resources away from all other sectors. By the same token, any cost-effective change in the pattern of production away from energy should strengthen the nation's overall economy. This is particularly true to the extent that the new production recipe reduces the levels of imported energy.

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