

**THE IMPACT OF CLEAN AIR REGULATIONS ON
NATURAL GAS PRICES**

HEARING

BEFORE THE

SUBCOMMITTEE ON CLEAN AIR, CLIMATE CHANGE,
AND NUCLEAR SAFETY

OF THE

COMMITTEE ON ENVIRONMENT AND
PUBLIC WORKS

UNITED STATES SENATE

ONE HUNDRED NINTH CONGRESS

SECOND SESSION

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FEBRUARY 9, 2006
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ONE HUNDRED NINTH CONGRESS

SECOND SESSION

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THE IMPACT OF CLEAN AIR REGULATIONS ON NATURAL GAS PRICES

THURSDAY, FEBRUARY 9, 2006

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
SUBCOMMITTEE ON CLEAN AIR, CLIMATE CHANGE,
AND NUCLEAR SAFETY,
Washington, DC.

The subcommittee met, pursuant to notice, at 9:30 a.m. in room 628, Senate Dirksen Building, Hon. George V. Voinovich (chairman of the subcommittee) presiding.

Present: Senators Voinovich, Inhofe, Jeffords, Carper, and Lautenberg.

Senator VOINOVICH. This hearing will come to order. I thank all of you for coming.

OPENING STATEMENT OF HON. GEORGE V. VOINOVICH, U.S. SENATOR FROM THE STATE OF OHIO

Before I begin, I would like to express my disappointment that EPA was unable to submit their testimony before this hearing even 2 hours before it was scheduled to begin. Our committee rule is, that if there is a witness who is scheduled to testify at a hearing of a committee or subcommittee they shall file 100 copies of the written testimony at least 48 hours before the hearing. If a witness fails to comply with this requirement, the presiding officer may preclude the witness's testimony. After conferring with Senator Carper, the Ranking Member of the committee, I must protect the committee's rules and its members and now allow the EPA testimony to be submitted for the record.

I understand that there are lots of steps involved with finalizing an agency's testimony and having it approved by the Administration. As I mentioned to you, Mr. Wehrum, I know that you are embarrassed today. I would like you to convey back to the Agency that I expect that this is going to be the last time that this is going to occur.

As my colleagues on the committee know, I have long been concerned about our Nation's competitiveness. If our children and grandchildren are going to enjoy the same opportunities that we have had, we must develop what I refer to as the new infrastructure of competitiveness. The President has recognized this need by announcing the American Competitiveness Initiative and embracing most of the math and science education recommendations of the National Academy of Sciences, the study, "Rising Above the Gathering Storm."

He also made a commitment to move America toward energy independence—I like to refer to this as the second declaration of independence—to make us less reliant on foreign sources of energy, especially from countries that do not share our values and could hold us hostage. If you had sat in on the Foreign Relations hearings that I did, you would be shaking in your boots in terms of 11 percent of our oil coming from that part of the world.

Today's hearing is about a key component of energy independence: harmonization of our energy, environmental and economic policies. Nowhere is our failure more apparent than in terms of natural gas.

The United States has the highest natural gas prices in the world. We have the highest natural gas prices in the world. It has had a devastating impact. Families in over 60 million homes that use natural gas for heat are struggling to pay their utility bills. Thank God that this winter has been not as bad as we had expected.

High prices have permanently shut down 17 nitrogen fertilizer plants representing 20 percent of our production capacity. In fact, today I met recently with our folks in the Farm Bureau. Farmers in Ohio are planting less corn and more wheat and soybeans because they do not need nitrogen fertilizer.

Chemical manufacturers went from being the most successful export industry in the history of our Nation in the late 1990's to a net importer. An official from Bayer warned me 3 years ago, came to my office 3 years ago and said jobs would be sent overseas unless something was done about high prices of natural gas. Since they remain high, last week he told me that today instead of 22,000 employees in the United States, they now have 14,000. Those jobs have disappeared, and I am not sure they will ever come back.

Our environmental policies have played a role in exacerbating the demand for natural gas and limiting the supply. This hearing will examine a relationship that many cite as one of the causes for high natural gas prices: that our clean air regulations have increased natural gas demand because electricity can be generated cleaner from it than from coal.

It is important that the American public understand the context of this discussion. We have made great progress in reducing our emissions, considering the growth of the economy. This hearing is about how to best continue to improve our air quality.

I think you can see from the chart that is here is that in terms of the six worst emissions that we have, and that is from 1990, we are talking about, yes, from 1990, we have had an increase in our gross domestic product of 187 percent. We have had an increase in the miles traveled by automobile of 171 percent. Our energy consumption has gone up 47 percent, and our population 40 percent.

So we have a growing economy and a lot of things that we are doing that are causing a lot more emissions in this country. Yet in spite of that, we have been able to reduce our emissions significantly since that time. The point is, we are making progress. I think there is some tendency sometimes out there to say it is getting worse. The fact is, it is getting better if you compare it with how our economy is growing.

I am going to focus mainly on what has occurred since enactment of the Clean Air Amendments of 1990 which required cuts in power plant emissions. On chart 2, this chart shows that over the past 20 years, the percentage of electricity generated from coal has significantly decreased from an energy, economic and national security perspective. This is bad news, as coal is our most abundant and lowest cost domestic energy source. We are the Saudi Arabia of coal. We have over 250 years of coal supply.

Chart 3, over the same period, the percentage of electricity generated from natural gas has increased greatly. Thus as the percentage of coal decreased in the 1990's, natural gas generation increased to meet electricity demand. As stated earlier, natural gas is used by many different consumers. From 1990 to 2005, while production remained basically flat, the percentage of natural gas used to generate electricity increased from 19 percent to 27 percent. You see 1990, and then the use of natural gas went up to 27 percent.

This rise, without a reciprocal increase in supply, has led to an escalation of natural gas prices and a reduction in industrial use. The electric sector is projected to increase use by 3 more percentage points by 2020. But this analysis is based on the current regulatory situation and does not anticipate the initiatives that we have seen here in the last couple of years dealing with greenhouse gas emissions.

Although this hearing is not about supply, which Chairman Inhofe covered in a 2004 hearing, it is a big part of the story. If you look at the chart there, the consumption is expected to outpace the domestic production by a great deal. So the difference is projected to be made up by liquified natural gas, imports from other countries, and unfortunately, just like oil, we have some real concern about liquified natural gas.

The question that people are asking who are in the countries that are going to produce it is, are we going to be able to go forward with the terminals that we have talked about. There is a lot of concern about what we call not in my back yard. We don't want them here.

I was up in the Bay of Fundy, they are talking about a liquefied natural gas port there. People in the community, that is just off of Maine, they don't want it. So there is a lot of concern about whether or not we are going to get this liquefied natural gas that folks say we are going to get.

Simply put, if we increase demand through our policies, then we must also increase our supply. That is why I am a co-sponsor of the bill introduced this week by Senators Domenici and Bingaman to open the Gulf of Mexico's Lease 181 area of drilling, 100 miles of the Florida coast. This could provide heat for 15 years for nearly 5 million homes, enough for all of Ohio's households.

We also took action in the recently enacted Energy bill. I think the public has not fully appreciated what is in that bill. It encourages more production in public lands, in Alaska's Natural Petroleum Reserve, promotes the construction of those LNG terminals I just talked about, increases the use of clean coal technologies, nuclear power and renewables, which will diminish the use of natural gas for electricity generation.

However, there is no immediate solution to reduce high natural gas prices. I think that is really something that we should be level with the public about. Since 1990, natural gas prices have increased substantially, more than tripling for families in my State, with an average price of \$16.76 per 1,000 cubic feet in November 2005.

To relieve this burden, we have increased LIHEAP funding by about 73 percent since I came to the Senate in 1999, and we are working to provide more funding right now. In considering our environmental policies, we must bear in mind the impact on the impoverished and understand that we have already greatly improved our air quality, because LIHEAP is not a solution. We have to deal with the issues of increasing our supply.

I look forward to hearing from the witnesses about what we can learn from the past 15 years as we continue to improve the environment and protect our health. With natural gas prices already through the roof, families and peoples' jobs are depending upon us to take into account the impact of clean air regulations on our Nation's energy and economic policies.

[The prepared statement of Senator Voinovich follows:]

STATEMENT OF HON. GEORGE V. VOINOVICH, U.S. SENATOR FROM THE
STATE OF OHIO

The hearing will come to order. Good morning and thank you all for coming.

As my colleagues on this committee know, I have long been concerned with our Nation's competitiveness. If our children and grandchildren are to enjoy the same opportunities that we have had, we must develop a new infrastructure of competitiveness.

The President has recognized this need by announcing the American Competitiveness Initiative and embracing most of the math and science education recommendations in the National Academy of Sciences study: "Rising Above the Gathering Storm." He also made a commitment to move America toward energy independence. I refer to this as the 'Second Declaration of Independence' to make us less reliant on foreign sources of energy—especially from countries that do not share our values and could hold us hostage.

Today's hearing is about a key component of energy independence—harmonization of our energy, environmental, and economic policies. Nowhere is our failure more apparent than natural gas prices.

The United States has the highest natural gas prices in the world—which is having a devastating impact:

- Families in the over 60 million homes that use natural gas for heat are struggling to pay their utility bills;
- High prices have permanently shutdown 17 nitrogen fertilizer plants, representing 20 percent of our production capacity—in fact, farmers in Ohio are planting less corn and more wheat and soybeans because they do not need nitrogen fertilizer;
- Chemical manufacturers went from being the most successful export industry in the history of our Nation in the late 1990's to a net importer; and
- An official from Bayer warned me 3 years ago that jobs would be sent overseas unless something was done about high prices, and since they remain high, he told me last week that their U.S. employment has been reduced from 22,000 jobs in 2002 to 14,000.

Our environmental policies have played a role in exacerbating the demand for natural gas and limiting the supply. This hearing will examine a relationship that many cite as one of the causes for high natural gas prices—that our clean air regulations have increased natural gas demand because electricity can be generated cleaner from it than from coal.

It is important that the American public understand the context of this discussion. [CHART 1] We have made great progress in reducing our emissions considering the growth of the economy. This hearing is about learning how best to continue to improve our air quality.

I am going to focus mainly on what has occurred since enactment of the Clean Air Act Amendments of 1990, which required cuts in power plant emissions. [CHART 2] This chart shows that over the past 20 years the percent of electricity generated from coal has significantly decreased. From an energy, economic, and national security perspective, this is bad news as coal is our most abundant and lowest cost domestic energy source. We are the Saudi Arabia of coal with over 250 years of supply.

[CHART 3] Over this same period, the percent of electricity generated from natural gas has increased greatly. Thus, as the percentage of coal decreased in the 1990's, natural gas generation increased to meet electricity demand.

As stated earlier, natural gas is used by many different consumers. [CHART 4] From 1990 to 2005, while production remained basically flat, the percentage of natural gas used to generate electricity increased from 19 to 27 percent. This rise without a reciprocal increase in supply has led to an escalation of natural gas prices and a reduction in industrial use. The electric sector is projected to increase use by three more percentage points by 2020, but this analysis is based on the current regulatory situation—it does not anticipate proposals by some of my colleagues.

Although this hearing is not about supply, which Chairman Inhofe covered in a 2004 hearing, it is a big part of this story. [CHART 5] Out to 2030, consumption is expected to continue to outpace domestic production by a great deal. Some of this difference is projected to be made up by liquefied natural gas (LNG) imports from other countries—unfortunately, just like oil.

This is unacceptable since we have resources at home that we are not accessing. Simply put, if we increase demand through our policies, then we must also increase supply. That is why I am a cosponsor of a bill introduced this week by Senators Domenici and Bingaman to open the Gulf of Mexico's Lease 181 Area to drilling 100 miles off the Florida coast. This could provide heat for 15 years for nearly 5 million homes—enough for all of Ohio's households.

We also took action in the recently enacted Energy bill to:

- Encourage more production on public lands and in Alaska's National Petroleum Reserve;
- Promote the construction of LNG terminals and a pipeline from Alaska; and
- Increase the use of clean coal technologies, nuclear power, and renewables—which will diminish the use of natural gas for electricity generation.

However, there is no immediate solution to reduce high natural gas prices today. [CHART 6] Since 1990, natural gas prices have increased substantially—more than tripling for Ohio families, with an average price of \$16.76 per thousand cubic feet in November 2005. Ohioans are struggling to pay their utility bills, especially the poor and elderly on fixed incomes.

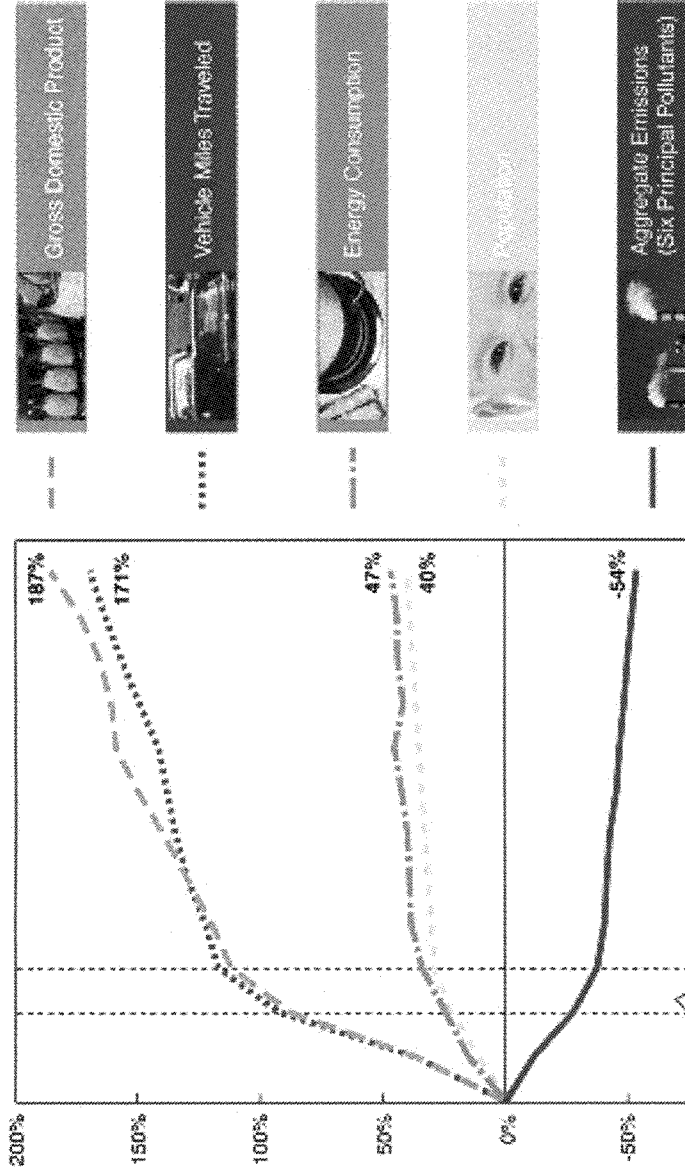
To relieve this burden, we have increased LIHEAP funding by about 73 percent since I came to the Senate in 1999 and are working to provide more funding right now. In considering our environmental policies, we must bear in mind the impact on the impoverished and understand that we have already greatly improved our air quality because LIHEAP is not a solution.

I look forward to hearing from the witnesses about what we can learn from the past 15 years as we continue to improve the environment and protect public health. With natural gas prices already through the roof, families and people's jobs are depending upon us to take into account the impact of clean air regulations on our Nation's energy and economic needs.

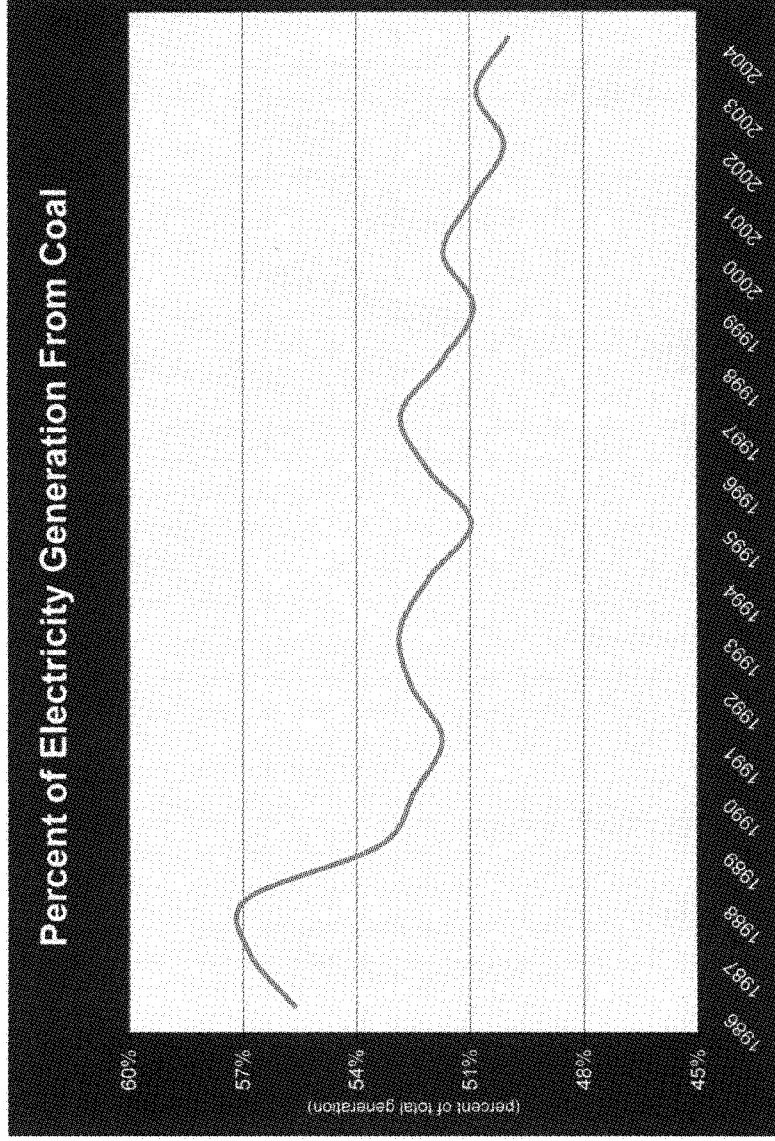
Thank you.

[The referenced charts follow:]

Comparison of Growth Areas and Emissions

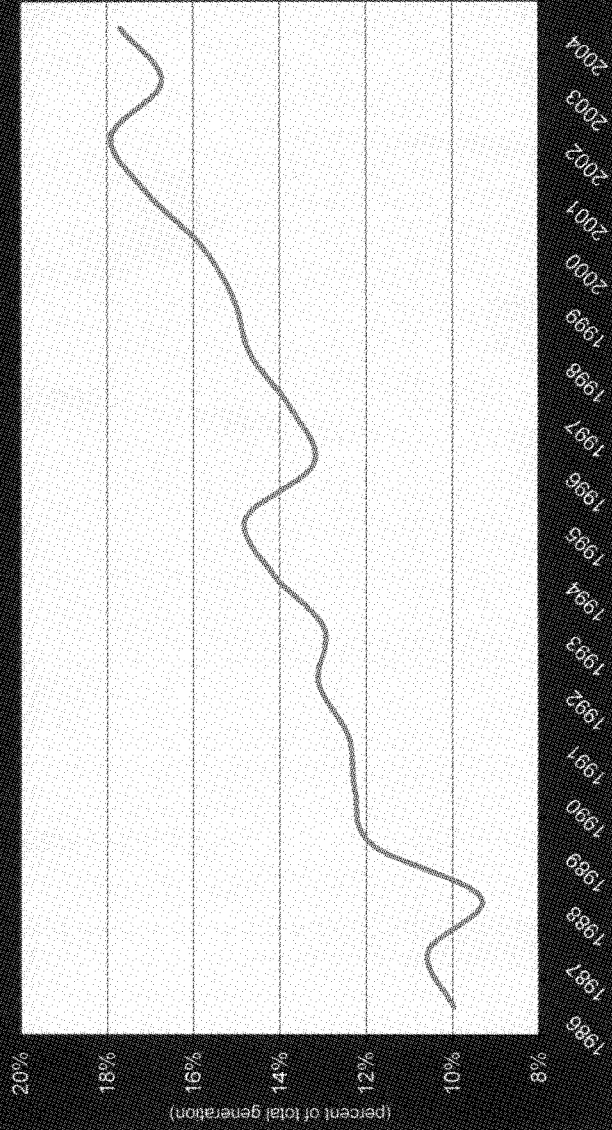


Source: Environmental Protection Agency, National Air Quality and Emissions Trends Report (2004 data).



Source: Energy Information Administration

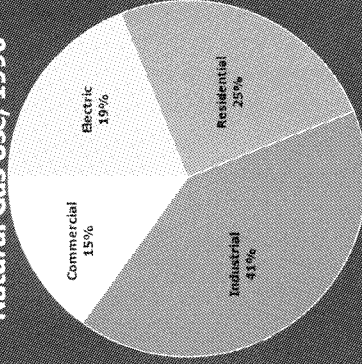
Percent of Electricity Generation From Natural Gas



Source: Energy Information Administration

Natural Gas Consumption

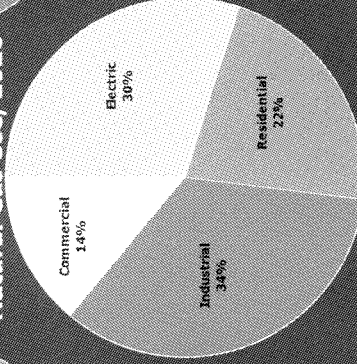
Natural Gas Use, 1990



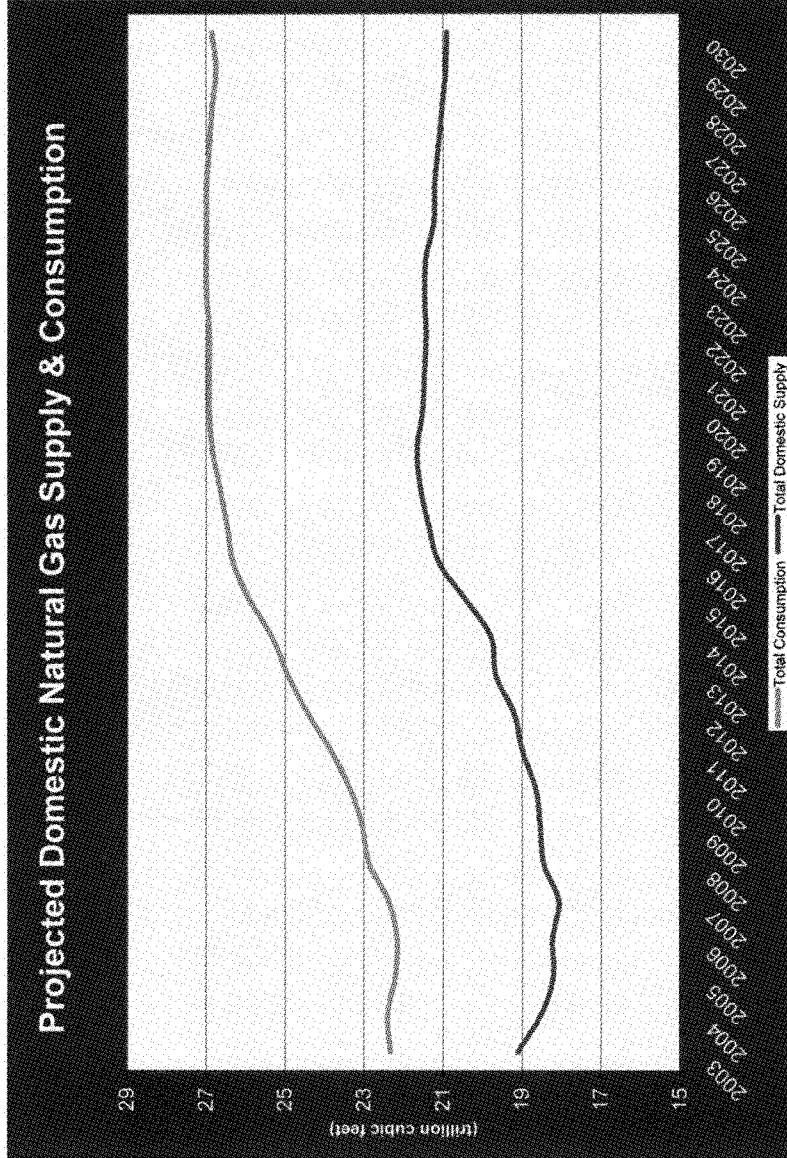
Natural Gas Use, 2005



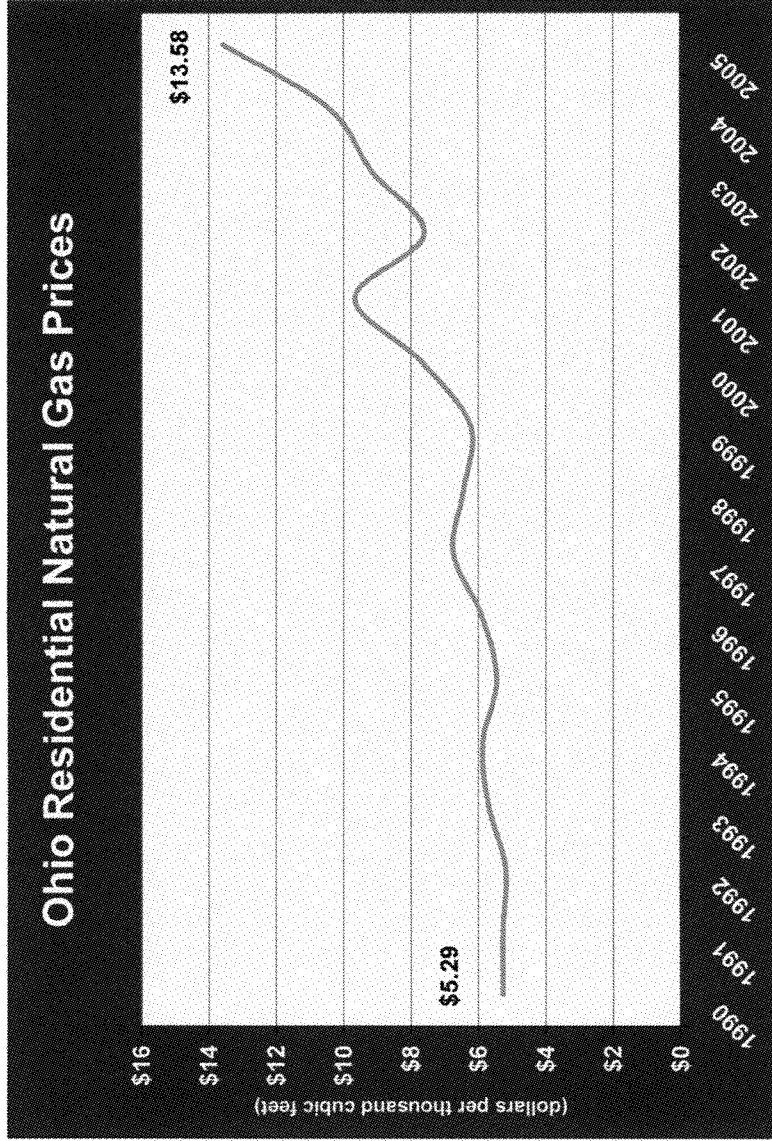
Natural Gas Use, 2020



Source: Energy Information Administration (excludes transportation, pipeline fuel, and lease and plant fuel)



Source: Energy Information Administration



Sources: Energy Information Administration

Senator VOINOVICH. Senator Lautenberg.

**OPENING STATEMENT OF HON. FRANK R. LAUTENBERG,
U.S. SENATOR FROM THE STATE OF NEW JERSEY**

Senator LAUTENBERG. Thanks very much. Mr. Chairman, I commend you for calling this hearing and giving us an opportunity to learn more about this problem that affects American families across the country, that is, the soaring price of natural gas. Now, last year the average price of natural gas, as the Chairman mentioned, was three times higher, more than three times higher, the average price, during the 1990's, the decade in which gas prices were relatively stable. This increase hits families hard. It drives up their home heating bills or electricity bills, the cost of manufactured goods. There seems to be a consensus among today's witnesses that there are a number of causes for soaring gas prices.

The first is increased demand. In 1950, as we saw on the charts, if your eyesight was terrific, the type size was a little hard from here, but anyway, that in 1950, natural gas represented just 16 percent of the total energy consumption of the United States. Today, natural gas meets almost 24 percent of our energy needs. Another factor in the rising cost, and since we are focused in this hearing on the cost side of things, we have to look at how our progress was so slow in improving energy efficiency.

Now, we know we can do a better job of conserving energy when we try. After the Arab oil embargo in 1973, our country got serious about conserving oil. We applied our American ingenuity and by 1990, our vehicles used about 40 percent as much fuel as they did in 1973. Energy efficiency is vital to our national interest today as it was 33 years ago. We have to recommit ourselves to the goal.

Now, these are the main reasons in my view for the rise in gas prices, and not the Clean Air Act. What I am concerned about, Mr. Chairman, is that we are looking in the kind of wrong direction, I think, if we are going to compare the use of natural gas and to the requirements of the Clean Air Act and suggest those are the reasons for the increased price, the outrageous increased price. It is true that natural gas has become more popular because it is a clean form of energy. That is one of its advantages.

But blaming high gas prices on the Clean Air Act is like blaming obesity on the fact that human beings have to eat to survive. The Clean Air Act has been one of our most successful environmental laws, saving lives and preserving our environment. As a grandfather of a child who has asthma, childhood asthma, and it is a tough condition. When we look at the statistics, we see that the growth in childhood asthma has almost been exponential, and other respiratory diseases. We have to fight to protect those young people from further damage to their health.

So I think, Mr. Chairman, that we have to be circumspect about where the price of natural gas, how it comes about, and the effects on the standard of health that we have in this country. We already know that the benefits of the Clean Air Act have vastly outweighed the cost. I don't ignore the terrible penalty that the high price of natural gas imposes on families across the country. It is an essential factor in the lives and well-being of our people. But at the same time, so is the quality of the air that we breathe.

So Mr. Chairman, I thank you for doing this. I unfortunately can't stay, but I appreciate the fact that you have brought up the subject. I think that we have to again look very carefully at the consequences of pointing a finger of blame for natural gas price increases on anything that otherwise improves the health of our population.

Thank you.

Senator VOINOVICH. Thank you, Senator Lautenberg.

Senator Inhofe, we are very happy to have you here.

Senator INHOFE. Thank you, Mr. Chairman.

**OPENING STATEMENT OF HON. JAMES M. INHOFE,
U.S. SENATOR FROM THE STATE OF OKLAHOMA**

First of all, let me say we are honored to have Senator Voinovich as the Chairman of the Clean Air Subcommittee. I don't think there is anyone who knows more about the clear air problems and the Clean Air in the country. I would say this, too, Senator Lautenberg, that we were supporters of the Clean Air Act. If you look at what has happened since the Clean Air Act in terms of the amount of, in terms of what has happened in the way of pollution, we are driving more miles, the air is cleaner, so it is a success story.

I don't think anyone is saying it is the Clean Air Act. What we are saying is that one of the basic things we learned was supply and demand. You can't conserve your way out of this problem we have right now, we need to be drilling offshore. We need to be increasing our supply. That is kind of the basic philosophical difference that we have on this committee.

But in the case of Senator Voinovich, back when I was chairman of this subcommittee, he was Governor of Ohio. He came and testified before this committee, and brings that expertise that others don't have. So I appreciate the fact that you are taking on that responsibility.

Two years ago, in March 2004, the full committee held an oversight hearing discussing the relationship between the environmental policies and natural gas. At that hearing, members of this committee heard testimony from witnesses representing a variety of industries. The witnesses at that hearing stated that high natural gas prices are destroying U.S. manufacturing. In fact, the Rhode Island Governor, who was here, Governor Carcieri, testified that, "Soon, the Northeast may no longer be able to offer industry a competitive venue unless the rising cost of energy is addressed."

In my State of Oklahoma, the Oklahoma Farm Bureau has testified that the cost of fertilizer has gone up. You mentioned this in the State of Ohio. This is all over the country. That has an effect on the cost of everything that is produced out there.

I realize that this is a demand-side focused hearing, asking the extent to which the Clean Air Act has impacted natural gas. All of the evidence from the EIA, which is an independent organization, the Energy Information Agency, all the way from the EIA to the Natural Petroleum Council to today's witnesses, agree that it certainly has. Members of this committee probably recall Governor Carcieri's plain statement that, "Federal and State policy has encouraged the use of natural gas because it is clean-burning."

We have had all these hearings about the pollutants in the air. Everybody does agree on this, that natural gas is clean-burning. So the demand is much greater. But demand alone does not make prices spike. But demand without corresponding supply increases does. That is very basic.

One could conclude after reading the New York Times or rhetoric from the environmental groups that the United States is increasing natural gas production, but the facts show just the opposite.

This chart from the EIA shows just how much domestic production of natural gas has declined. People will say in their testimony it hasn't declined. It has declined. There it is, right in front of you. The EIA's consumer guide, "Residential Natural Gas Prices, What Consumers Should Know," states that, "one of the most significant factors why prices are so high is due to weak production."

I investigated the reasons why our Nation is experiencing what has been called by many stakeholders, including the American Chemical Council, a natural gas crisis. My analysis of the situation and conclusions were recently published in the Energy Law Journal. This is this document right here. I included this graph from Dr. Jeffrey Currie, managing director of Goldman Sachs and Company in that article. Dr. Currie testifies that the loss in industrial demand was massive, a 20 percent permanent decline that resulted in the loss of at least 200,000 manufacturing jobs.

Senator Voinovich has talked about the manufacturing jobs that he has lost in the State of Ohio. We haven't lost that many in Oklahoma because we didn't have that kind of a manufacturing base. But it is real. It is there. They are going to Western Europe and other places where, as you mentioned, the cost of natural gas here is the highest in the world. This demand-side focused hearing and this chart depicts an economic phenomenon known as, "demand destruction."

Now, how could anyone look at this and say that there is not that relationship in supply and demand up there that we are talking about? It is fairly level. If you look all the way from 1993 to the year 2000, you have your employment, manufacturing employment and your wellhead natural gas prices, they are horizontal, they are parallel to each other. Then all of a sudden, you have the price increase and at the same time, look at what has happened to employment. This is what happened to your jobs in Ohio. There it is, right there. As you can see, when natural gas prices increased to excessive levels, the demand for that gas drops as plants close down and people lose their jobs.

I am troubled that the price situation has not improved since the committee's last hearing. In fact, some members continue to oppose new domestic production or even importing gas in the form of LNG. Further, to their own States' detriment, they advocate for air policies that would increase those price pressure all the more, such as opposing new source review reforms and advocating plant by plant mercury controls, as well as calling for the imposition of carbon caps.

The loop between environmental regulation is clear, as the congressional Joint Economic Committee stated, "Environmental laws passed in the 1980's and 1990's and their subsequent regulations encourage utilities to use clean-burning natural gas rather than

coal or oil.” Even California’s Energy Commission concurs, concluding that natural gas has allowed power plant developers to meet local air quality regulations and implement the Federal Clean Air Act.

It is time that policymakers recognize that our actions in Congress can significantly affect the cost of natural gas. It is such a basic concept, I was speaking this morning to one of the consumer advocates in the State of Oklahoma. Her name was Hannah Robson. She was talking about the fact that her gas prices have increased, have tripled, actually, since last year at this time. She said, “don’t people in Washington understand the basic concepts of supply and demand?” I had to say no.

Thank you, Mr. Chairman.

[The prepared statement of Senator Inhofe follows:]

STATEMENT OF HON. JAMES M. INHOFE, U.S. SENATOR FROM THE
STATE OF OKLAHOMA

I want to start off by thanking my friend and subcommittee Chairman George Voinovich for holding this hearing. Senator Voinovich has a unique understanding how environmental policies, specifically air regulations, affect consumers and businesses.

Nearly 2 years ago, in March 2004, the full committee held an oversight hearing discussing the relationship between environmental policies and natural gas. At that hearing, members of this committee heard testimony from witnesses representing a variety of industries.

The witnesses at that hearing stated that high natural gas prices are destroying U.S. manufacturing. In fact, Rhode Island Governor Carcieri testified that, “Soon, the Northeast may no longer be able to offer industry a competitive venue unless the rising cost of energy is addressed.” Oklahoma Farm Bureau Vice President stated that high natural gas prices have forced the closure of 25 percent of domestic fertilizer industry and that those high prices threaten what’s left, and increase U.S. dependence, not just on foreign sources of energy, but on fertilizer.

I realize that this is a demand-side focused hearing asking the extent to which the Clean Air Act has impacted natural gas. All of the evidence, from the EIA to the National Petroleum Council, to today’s witnesses agrees that it certainly has. Members of this committee probably recall Governor Carcieri plain statement that, “Federal and State policy has encouraged the use of natural gas, because it’s clean-burning.”

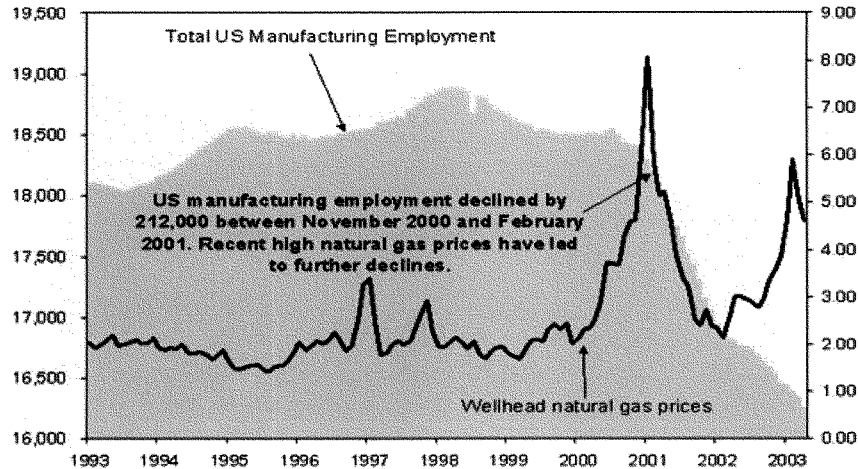
Yet, demand alone does not make prices spike, but demand without a corresponding supply increase does. One could conclude after reading the New York Times or rhetoric from environmental groups that the United States is increasing natural gas production, but the facts show just the opposite.

This chart from the Energy Information Administration shows just how much domestic production of natural gas has declined.

EIA’s consumer guide, “Residential Natural Gas Prices: What Consumers Should Know” states that: “One of the most significant factors why prices are so high is due to “Weak Production.”

I investigated the reasons why our Nation is experiencing what’s been called by many stakeholders including the American Chemistry Council, a natural gas crisis. My analysis of the situation and conclusions were recently published in the Energy Law Journal.

I included this graph from Dr. Jeffrey R. Currie, managing director of Goldman, Sachs & Co. in that article. Dr. Currie testified that “[t]he loss in industrial demand was massive: a 20 percent permanent decline that resulted in the loss of at least 200,000 manufacturing jobs.”



This is a demand-side focused hearing, and this chart depicts an economic phenomenon known as "demand destruction."

As you can see, when natural gas prices increase to excessive levels, the demand for that gas drops as plants close down and people lose their jobs.

I am troubled that the price situation has not improved since the committee's last hearing. In fact, some members continue to oppose new domestic production or even importing gas in the form of LNG.

Further, to their own State's detriment, they advocate for air policies that would increase those price pressures all the more, such as opposing new source review reforms and advocating plant-by-plant mercury controls, as well calling for the imposition of carbon caps.

The link between environmental regulations is clear. As the congressional Joint Economic Committee stated, "environmental laws passed in the 1980's and 1990's, and their subsequent regulations, encouraged utilities to use clean burning natural gas rather than coal or oil."

Even California's Energy Commission concurs, concluding that natural gas has allowed power plant developers "to meet local air quality regulations that implement the Federal Clean Air Act."

It is time that policymakers recognize that our actions in Congress can significantly exacerbate our natural gas crisis, and that we must keep the welfare of our manufacturing sector and the communities dependent foremost in mind as we legislate.

Senator VOINOVICH. Senator Jeffords.

**OPENING STATEMENT OF HON. JAMES M. JEFFORDS,
U.S. SENATOR FROM THE STATE OF VERMONT**

Senator JEFFORDS. Mr. Chairman, the Environmental Protection Agency was asked to testify at this hearing at the minority's request with advance notice. EPA failed to produce written testimony for this hearing on a topic as important as the Administration's, as the price of natural gas.

More than 15,000 people work at EPA, and yet the Agency could not produce a few pages of written testimony for us. I am extremely disappointed. Mr. Wehrum, at the appropriate time, I would like to know how this happened.

This testimony is critical, as we are supposed to be examining whether the Clean Air Act has had any effect on natural gas prices. I hope we will look carefully at what the evidence shows. I do not believe the Clean Air Act plays a major role on the current high natural gas prices.

As many of the witnesses will testify, recent natural gas price spikes are the result of many factors, including weather, imports, market speculation and the ratio of actual production for proven capacity. While new gas power generation has increased, there are many reasons besides environmental considerations that make gas more attractive for new power plants than coal. These reasons are detailed by the Energy Information Administration in its testimony and Clean Air Act regulations are but one among many factors cited here.

The EIA also points out that between 1990 and 2000, electricity generation from coal grew by a larger amount than electricity generation from natural gas. Moreover, new gas generation typically replaces older, less efficient gas generation, leading to more electricity being generated from less gas.

All of these factors suggest that we should look very carefully in suggesting that the Clean Air Act played a significant role in driving the demand for increased natural gas use in electricity. It is also worth noting that human health and environmental benefits to the Clean Air Act greatly outweigh any cost. For example, the Office of Management and Budget has estimated that the benefits of the acid rain provision of the Clean Air Act outweigh the cost by somewhere between 2 and 20 times. EPA estimates that this provision has saved more than 18,000 lives per year and had enormous benefits for our forests, lakes and streams. The country still has a long way to go to improve air quality.

The committee's first and foremost responsibility is to protect public health and the environment. The Clean Air Act does just that. We must be mindful that as beneficial as the use of natural gas to generate electricity and heat for our homes and produce commodities has been to the public health by improving the air quality, it has also had real environmental impacts on our country's public and private lands.

We heard compelling testimony in March 2004 in this committee that Federal environmental laws were not sufficient to protect the property of landowners farming adjacent to natural gas wells. We have now weakened those laws. The new 2005 Energy Law exempts natural gas and oil production sites from Clean Water Act stormwater permit requirements. It exempts hydraulic fracturing from the Safe Drinking Water Act.

By deregulating natural gas through these provisions of the new Energy Law we have provided another incentive to use natural gas as opposed to other energy sources.

Thank you, Mr. Chairman, for holding this hearing, and I look forward to hearing from the witnesses.

[The prepared statement of Senator Jeffords follows:]

STATEMENT OF HON. JAMES M. JEFFORDS, U.S. SENATOR FROM THE
STATE OF VERMONT

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I hope we will look carefully at what the evidence shows. I do not believe the Clean Air Act plays a major role in our current high natural gas prices. As many of our witnesses will testify, recent natural gas price spikes are the result of many factors, including weather, imports, market speculation, and the ratio of actual production to proven capacity.

While new gas-fired generation has increased, there are many reasons besides environmental considerations that make gas more attractive for new power plants than coal. These reasons are detailed by the Energy Information Administration (EIA) in its testimony, and clean air regulations are but one among many factors cited there. The EIA also points out that between 1990 and 2000, electricity generation from coal grew by a larger amount than electricity generation from natural gas. Moreover, new gas generation typically replaced older, less-efficient gas generation, leading to more electricity being generated from less gas.

All of these facts suggest that we should be very careful in suggesting that the Clean Air Act played a significant role in driving the demand for increased natural gas use in the electricity sector.

It is also worth noting the human health and environmental benefits of the Clean Air Act greatly outweigh any costs. For example, the Office of Management and Budget has estimated that the benefits of the acid rain provisions of the Clean Air Act outweigh the costs by somewhere between 2 and 20 times. EPA estimates that this provision has saved more than 18,000 lives per year and had enormous benefits for our forests, lakes and streams.

The country still has a long way to go to improve air quality. This committee's first and foremost responsibility is to protect public health and the environment. The Clean Air Act does just that. We must be mindful that as beneficial as the use of natural gas to generate electricity, heat our homes, and produce commodities has been to public health by improving our air quality, it has also had real environmental impacts on our country's public and private lands.

We heard compelling testimony in March of 2004 in this committee that Federal environmental laws were not sufficient to protect the property of landowners farming adjacent to natural gas wells. We have now weakened those laws. The new 2005 Energy law exempts natural gas and oil production sites from Clean Water Act stormwater permit requirements. It exempts hydraulic fracturing from the Safe Drinking Water Act. By deregulating natural gas through these provisions of the new Energy law, we have provided another incentive to use natural gas as opposed to other energy sources.

Thank you, Mr. Chairman, for holding this hearing. I look forward to hearing from the witnesses.

Senator VOINOVICH. Thank you. Senator Carper.

**OPENING STATEMENT OF HON. THOMAS R. CARPER,
U.S. SENATOR FROM THE STATE OF DELAWARE**

Senator CARPER. Thanks, Mr. Chairman. To our witnesses, welcome. We are delighted that you are here.

Senator Jeffords spoke of his disappointment in not having EPA's testimony on a more timely basis. Our Chairman spoke to that as well. I realize that people at EPA could have prepared their testimony a month ago, and sometimes you have to get it approved by other folks up the food chain. I would say to not so much maybe at EPA but those other folks who have to look at the testimony that you prepared that not only do we expect you to meet your obligation, but we expect them to help you meet your obligation to provide us with testimony on a timely basis.

I have a statement I would like to offer for the record, if I could, Mr. Chairman. I will just say very briefly, this is an issue we have to get our arms around. There are all kinds of things we need to do. We need to work on the supply side and on the demand side. We need to do both, and I think we will have an opportunity to consider both of them as we get into this year.

We have this huge abundance of coal. We have the technology to burn it cleanly. We need to incentivize that technology and make

sure that as new utility plants are built in this country, and frankly in other countries, that they use American technology and that we find ways to use this resource that we are blessed with abundantly and create a lot of the electricity that otherwise we are creating through natural gas.

We have the ability to do a lot more with wind than we ever could before. I reminded my colleagues, when I went through the southern part of California a while ago, mile after mile after mile of windmill farms generating a lot of the electricity needs for that part of our country. We have a big GE operation in Newark, DE, where they are developing next generation solar energy cells, as we try to make them more competitive in terms of providing electricity in a variety of places, and they are coming along very nicely.

I am an advocate of next generation nuclear power plants and finding, investing some considerable resources into disposing of the waste product from our nuclear power plants. It is all part of that. Conservation is a big part of it as well. This summer is, right now it is cold, they are forecasting snow maybe for this coming weekend.

But in a few months it will be warm and the summer will be hot. The air conditioners that are being sold in this country today have a new CAIR requirement, it is a CAIR 13 requirement, which compared to the CAIR 8 requirement or a CAIR 10 requirement which would have otherwise been in effect means that we are going to be using a lot more energy in this new air conditioners.

Altogether, because of this new CAIR requirement for more energy efficient air conditioners, there are about 150 power plants I am told we will not have to build between now and 2020. There is a lot of stuff that we can do, conservation, alternative forms of energy, clean coal technology, next generation nuclear.

Finally supply. There is a supply out there, and it is not all up off of the coast of Alaska. There is probably some extra supply down in the Gulf of Mexico that we ought to have the opportunity to explore and to do so in ways that are safe and sound. So it has to be both of them, and I know that the Chairman shares this opinion, I suppose we all do.

The price of natural gas is hurting our folks this winter as we try to heat our homes. It is killing us as we try to compete with the rest of the world. Whether it happens to be in agriculture, fertilizer products, chemical products, and so forth, people who use natural gas a fair amount, the fact that we pay \$10 and other places around the world they are paying \$1 or \$2, we can't compete with that. We need to be able to compete successfully.

So Mr. Chairman, I am delighted we are here, glad we are having this conversation. I am not going to be able to be here for all the panels. But this is one of those rare panels where I will actually read every word of your testimony. This is something I am very much interested in, and delighted that you are here with us. Thank you.

Senator VOINOVICH. Thank you, Senator Carper.

I think, I have been saying this for the last 7 years, that it is time to harmonize our environment, our energy and our economic interests in this country. The dilemma that we are faced with today is how do we continue to improve our environment and pub-

lic health and at the same time deal with the crisis that we have in terms of high natural gas prices that are impacting on our brothers and sisters who are less able than we are, and even just ordinary Americans, that these high costs are impacting upon decisionmaking in other areas of their lives.

Last but not least, how do we deal with the loss of jobs that we continue to see? There isn't any immediate answer to it. Our constituents are saying, we need the jobs, we can't afford the high natural gas costs. So I think somehow we have to figure out how we are going to move on this rapidly. So I am hoping maybe we can get some insights from some of our witnesses today.

We are very pleased today to have Dr. Gruenspecht, Deputy Administrator for the Energy Information Administration. We think you guys do a really good job. We are always quoting you. Bill Wehrum, who is the Acting Assistant Administrator for EPA's Office of Air and Radiation, Mr. Wehrum, you have been before this committee in the past, and we welcome you also.

We will begin the testimony with Dr. Gruenspecht.

STATEMENT OF HOWARD K. GRUENSPECHT, PH.D., DEPUTY ADMINISTRATOR, ENERGY INFORMATION ADMINISTRATION, U.S. DEPARTMENT OF ENERGY

Mr. GRUENSPECHT. Thank you, Mr. Chairman and members of the committee. I appreciate the opportunity to appear before you today to discuss developments affecting natural gas use, particularly in the power sector. My testimony reviews some changes that have occurred over the last 15 years and our projections through 2030.

As several of you have mentioned, EIA is an independent statistical and analytical agency within the Department of Energy. We do not promote, formulate or take positions on policy issues. But we do produce data, analyses and forecasts that are meant to assist policymakers, help markets function efficiently and inform the public.

We also don't have to clear our testimony, which is very helpful. [Laughter.]

Mr. GRUENSPECHT. In the aftermath of statutory and regulatory changes designed to increase the competitiveness of natural gas markets, wellhead natural gas prices moderated substantially during the 1990's relative to what was experienced during the 1980's. Gas consumers, particularly electric sector and large industrial users, also benefited from increasingly competitive natural gas transportation markets during this period, further reducing their delivered cost.

However, as I think all of you have mentioned, over the last 5 years, natural gas prices have indeed climbed significantly. The average wellhead price last year was estimated at \$7.26 per 1,000 cubic feet in 2004 dollars, more than triple the average wellhead price during the 1990 to 1999 period. Obviously as you go up the chain to residential consumers, prices are significantly higher.

Turning to consumption, natural gas use in the United States fell from 22.1 trillion cubic feet in 1972 to 16.2 trillion cubic feet in 1986, and then back up to about 22.7 trillion cubic feet in 1997. Since then, as has been mentioned, consumption has been rel-

atively stable. Consumption of natural gas for electricity generation has increased from a range of 3.2 to 3.9 trillion cubic feet during the early 1990's to 5.1 to 5.8 trillion cubic feet over the last few years. Rising use of natural gas by electric generators over the past decade has been roughly offset by a decline in natural gas use in the industrial sector, and the residential and commercial use has been pretty flat. The overall use therefore has been pretty flat.

Continuing to look at the data, it is clear that natural gas generation has become more efficient since 1990. Gas use has increased about 84 percent but gas generation has increased by 118 percent, in large part due to the shift toward more efficient combined-cycle units.

A lot of new gas-fired generating capacity has been built—230 gigawatts between 1990 and 2005. Again, nearly all the capacity added was natural gas-fired, as Figure 2 in my written testimony shows. That technology allows capacity to be added in modest increments, close to major load centers with a relatively short construction time. That technology, along with favorable natural gas prices during the 1990's, that we are unfortunately not experiencing now, the 1987 repeal of the provisions of the Power Plant and Industrial Fuel Use Act that had previously prohibited the use of natural gas by new generating units, and Clean Air Act provisions favoring the use of inherently cleaner fuels all played some role in driving this outcome.

The natural gas share of generation has not grown nearly as rapidly as its share of capacity. Under present natural gas market conditions, which are a cause of concern, many of the new natural gas plants are not operating very intensively and older, less efficient oil and natural gas plants are being retired.

I expect EPA will discuss the Clean Air Act and emission reductions. I would point out that emission reductions in the electric power sector were mostly achieved by adding emission control equipment or switching to lower sulfur coal at many of the Nation's coal plants. Cumulative retirements of coal-fired units between 1990 and 2004 represented less than 2 percent of that capacity and were generally concentrated among smaller units.

I would also add that some of the smaller industrial and commercial users of dirtier fuels, or less inherently clean fuels, face some of the same issues. Pollution control is less cost-effective on smaller units. So we saw less residual fuel oil being burned in the commercial and industrial sector, and less coal being burned in the commercial and industrial sector, although they were never really big users. Those areas also switched toward natural gas.

Although natural gas consumption grew more in percentage terms than coal generation between 1990 and 2005, coal generation actually increased by a larger amount in absolute terms. A major reason that so few coal plants were added during the 1990's relates to the need for the type of capacity that utilities needed. As you all know, load is not flat. It varies, has peaks and valleys.

In 1990, the average capacity factor of coal-fired power plants was only 59 percent while the average capacity factor of nuclear plants and other baseload technology was only 66 percent. These relatively low rates of utilization left substantial room for increases

in coal and nuclear generation without the need to add new capacity.

Turning from historical data to long-term projections, our latest long-term outlook was issued in December 2005. It is based on existing Federal laws and regulations in effect as of October 1, 2005. We included sections of the Energy Policy Act of 2005 that establish specific tax credits, incentives or standards, as well as the Clean Air Act Interstate Rule and the Clean Air Mercury Rule. We don't try to project what appropriations action is going to be taken on other parts of the bill. That's why we don't have to clear our testimony.

In the Annual Energy Outlook 2006 reference case, we do expect wellhead prices for natural gas to decline from current levels in real terms to a level of \$4.50 per 1,000 cubic feet in 2016. That is in 2004 dollars again, real dollars. Lower than we are today, but not nearly as low as the prices during the 1990's. After 2016, we expect wellhead prices to increase again, reaching nearly \$6 in real terms by 2030.

In terms of consumption, we do expect total demand to increase from now through about 2020 and then to remain relatively stable through 2030. The projected leveling off after 2020 is driven by changes in the mix of fuels to generate electricity, as we expect natural gas at those prices to lose market share to coal during the latter half of the projection period, sort of the reverse of what happened over the last period of time. So we expect natural gas demand for electricity generation to grow, but actually after 2020 we think it will be back down in favor of coal.

Between 2019 and 2030, we expect natural gas consumption in the electric power sector to decline by about 15 percent. Again, that is all under current laws and regulations. As some of the opening statements recognized, changes in those laws and regulations could have a significant impact. We expect demand for electricity to continue to grow over the next 10 years. Both natural gas and coal generation will increase as existing plants are used more intensively. Renewable generation will grow, in part due to the Energy Policy Act provisions.

But after 2010, we expect capacity additions to be increasingly dominated by new coal plants. We also have some nuclear capacity additions due, in our reference case, to the provisions of the Energy Policy Act. Barring unexpected problems and developing control technologies, we don't expect the Clean Air Interstate Rule and the Clean Air Mercury Rule to pose a significant barrier to the expansion of coal-fired generation. However, previous EIA analyses suggest that other types of emission regulation, particularly if greenhouse gas limits are included, could have a significant impact on projected coal use.

That completes my testimony, Mr. Chairman. Thank you. I realize I have gone a little over. I would be glad to answer any questions you or the other members may have.

Senator VOINOVICH. Thank you, Mr. Gruenspecht.
Mr. Wehrum.

STATEMENT OF WILLIAM WEHRUM, ACTING ASSISTANT ADMINISTRATOR, OFFICE OF AIR AND RADIATION, U.S. ENVIRONMENTAL PROTECTION AGENCY

Mr. WEHRUM. Thank you, Mr. Chairman.

I will begin by saying a couple of things. It is an honor and a privilege to have the opportunity to speak to this subcommittee. It is my responsibility to have testimony prepared and submitted to the subcommittee reasonably before the scheduling of the hearing. I failed in that responsibility. For that, I apologize to you.

I will say three things. One, these issues are extraordinarily important to EPA and to the Administration. So our failure to submit testimony on time is not a reflection of lack of interest or lack of concern about these issues.

The second thing is, if I have the privilege of speaking with you again, I will commit to you that this is not going to happen again.

The last thing I will say is, we stand ready to assist this subcommittee in its investigation and are prepared to submit additional information, respond to questions and provide the data and information that you need to fully vet this question.

At the beginning of this Administration, the President issued the National Energy Plan to address a vast array of energy-related policy issues and developed a flexible, market based program, Clear Skies, to achieve our Nation's air quality goals without compromising our economic growth and energy security.

In developing these initiatives, the Administration exerted great care to structure policies that are protective of human health and the environment while ensuring continued diversity of fuel use. Taken together, the NEP and Clear Skies acknowledge the important role that coal, our most abundant energy resource, plays in the mix as a source of low cost and abundant electricity. By the same token, these efforts directly help to alleviate demands on our Nation's gas supply and can be part of the long-term solution for our Nation's environmental and energy priorities.

Natural gas has increasingly been used in the electric power generating sector over the last 15 years. Between 1990 and 2003, 115 gigawatts of new combined cycle gas, which is 690 units, was added to the fleet, compared with only 11 gigawatts of new coal capacity, representing 68 new units.

It is clear that Clean Air Act requirements have an effect on natural gas utilization and supply. Many different programs affect the operation of utilities and large industrial units. EPA has not seen evidence, however, that its regulations of the power sector are a substantial factor in the pricing of natural gas.

EPA has taken many steps to design regulations and policies which maintain our Nation's diverse fuel mix. I will first look back at three major programs already adopted that affect the power sector. I will then talk about our recent actions and plans for the future.

Enacted in 1990 by Congress, the Acid Rain Program was tailored specifically to the power sector to reduce SO₂ and NO_x emissions from power plants. The centerpiece of the program is an innovative market-based cap and trade approach. This cap and trade approach provides greater certainty that emissions reductions will be achieved, while at the same time allowing industry the flexi-

bility they need. By embracing markets, allowing flexibility and requiring accountability, the Acid Rain Program has had only small impacts on natural gas markets.

EPA's NO_x-MSIP call is another cap and trade program. It is designed for the seasonal control of NO_x emissions from electric power industry in the eastern United States. During the development of the program, EPA forecast there would be some fuel switching to natural gas. However, as with the Acid Rain program, we found that the relative share of gas in the generation mix does not change substantially.

EPA's New Source Review Program allows for facilities to plan for the ability to combust multiple fuels, so long as state-of-the-art technology applies to the combustion of each fuel. Since NSR was first enacted in 1977, we have seen variation in the choice of fuels companies use to meet industrial energy demand. There have been periods of expanded coal use and periods of expanded natural gas use. We don't have information indicating that NSR has been a significant driver in this variation.

EPA finalized the Clean Air Interstate Rule, the Clean Air Mercury Rule and the Clean Air Visibility Rule in 2005. These rules give industry flexibility in how to achieve needed emissions reductions, allowing industry to make the most cost effective reductions and limiting impacts on consumers. If States choose to participate in the CAIR and CAMR, and I apologize for reverting to acronyms, but it comes with the territory, the CAIR and CAMR are cap and trade programs. Power plants would be allowed to choose the pollution reduction strategy that best meets their needs.

To address natural gas supply and demand concerns, EPA designed these programs to achieve large emissions reductions through the installation of pollution controls on coal-fired units, rather than by switching to natural gas. From analysis that EPA released last fall, we expect these three programs combined will increase natural gas prices by about 1.6 percent in 2010, and about 2.8 percent in 2020.

It is important to note that beyond the regulatory programs, the Clean Air Act authorizes many voluntary partnerships that work to provide more natural gas supply by encouraging companies to improve the efficiency of natural gas delivery and use. EPA analysis indicates that in 2010, these voluntary programs will have reduced national demand for natural gas by about 3 percent.

For example, in 2004, Natural Gas STAR, one of our programs which is a partnership between EPA and the oil and natural gas industry, offset the equivalent of 61 billion cubic feet of natural gas. Natural Gas STAR's accomplishment is just one example of the environmental and energy savings benefits that can be achieved by well-designed voluntary programs.

Importantly, EPA has taken many extensive efforts to design regulations and policies which maintain our Nation's diverse fuel mix. I can assure you that in implementing its mandate to protect public health and the environment, EPA will remain vigilant in its assessment of the impact that various policies may have on fuel use and will be particularly sensitive to natural gas cost and supply issues.

Thank you for the opportunity to be here. I would be happy to answer any questions.

Senator VOINOVICH. Thank you, Mr. Wehrum.

Dr. Gruenspecht, in your testimony, the fourth figure in your testimony shows that the EIA projects natural gas prices to be at their peak now, with a significant reduction in the next 10 years, before prices start increasing again. What assumptions have you made, first of all, how fast are they going to come down? Is it going to happen the 9th or 10th year?

Then second, what presumptions have you made? Have you presumed that the liquefied natural gas, the Energy bill that we passed, is going to be a reality? Do you take into consideration the possibility of drilling Lease 181? Just what are the things that you base your statistics on?

Mr. GRUENSPECHT. That is a very good question and I will try to answer. First of all, price is the hardest thing to look at, because we are operating, as has been suggested, in an area where supply seems to have not been very responsive to price, and demand is not very responsive to price. So very small shifts in either demand or supply can have a big impact on price. We have seen that this winter, where a warm January has led to a very sharp drop in prices. We are not comfortable where they are, but they have dropped a lot from where they were if we were having this hearing a month ago.

So in our long-term price projections, we try to abstract from all of the short-term factors, which are important. We do have liquefied natural gas coming on in greater quantity. In 2005, imports were about the same as in 2004. Even with the existing terminals that we have now, the five that we have, and there are some others under construction, we do expect liquefied natural gas imports to increase over time.

We do not have in our projection the area 181 sale, because current laws and regulations, current regulations, anyway, rule out the 181 sale. I do understand that the Department of Interior yesterday released a draft proposal involving some future leasing, although I am not familiar with details.

We do have some increases in unconventional gas, tight sands gas, which has started to be a success story.

Senator VOINOVICH. What is that again?

Mr. GRUENSPECHT. Tight sands gas and some coal bed methane increases. So those are reflected in our projections. It is a tight balance between supply and demand, but we do see the liquefied natural gas and some of the unconventional gas resources, and also some recovery in the Gulf. Obviously, in 2005 we have a significant issue with gas production in the Gulf of Mexico, due to the hurricanes.

So those are the types of factors that we have included in the short run. Over time, we have the Alaska Pipeline coming in, although that doesn't come in until about 2015. So we do have pipeline gas coming down from Alaska in this long run projection.

So it is LNG, pipeline gas from Alaska, tight sands gas, and coal bed methane but conventional gas production is pretty anemic. We also have pipeline imports from Canada being pretty anemic. Can-

ada has supplied about 15 percent, 16 percent of our gas. We expect that to fall off.

Senator VOINOVICH. Could you put that down on a piece of paper in terms of what are your presumptions based on, so we can get some sense of what happens, for example, if things become destabilized over in the Middle East?

Mr. GRUENSPECHT. Absolutely.

[The referenced information follows:]

Liquefied Natural Gas (LNG).—What would happen to U.S. LNG imports, if the Middle East continues to be destabilized and LNG terminals are not built?

The Energy Information Administration's (EIA) Annual Energy Outlook 2006 (AEO2006) projections do not specifically address how foreign political instability affects world LNG markets, but the AEO2006 does address the question of the potential impacts of reduced LNG supplies on U.S. energy markets in one of the sensitivity cases analyzed. The AEO2006 Low LNG Supply case assumes LNG supplies are significantly restricted. As a result, future LNG imports remain slightly below 1.4 trillion cubic feet per year through 2030, which is about 31 percent of the 4.4 trillion cubic feet projected to be imported in the reference case.

As a result of the reduction in LNG imports, the wellhead price of natural gas in the Low LNG Supply case is projected to be between 4 and 10 percent higher between 2010 and 2030 than in the reference case. In 2030, the natural gas wellhead price is \$0.44 per thousand cubic feet (mcf) higher, increasing from \$5.92 per mcf (2004 dollars) in the reference case to \$6.36 per mcf in the Low LNG Supply case. As a result of these higher prices, domestic natural gas production is 6 percent higher, at 22.0 trillion cubic feet, and domestic natural gas consumption is 6 percent lower, at 25.3 trillion cubic feet.

The higher gas prices in the Low LNG Supply case have the greatest impact on natural gas consumption in the electric power-sector because that sector is the most price-sensitive, and due to the competition between natural gas and coal for power generation. In the Low LNG Supply case, electric power sector-natural gas consumption is projected to be 21 percent lower than in the reference case, at 5.0 trillion cubic feet in 2030.

Senator VOINOVICH. I think we are talking about liquefied natural gas coming from Qatar.

Mr. GRUENSPECHT. We don't model specifically where it comes from. But Qatar is definitely a big source of gas; also Trinidad and Tobago. Liquefaction facilities, I believe, we have built in Nigeria; there are some being built up in Norway and Russia. So there are a lot of places. But Qatar is an important source of gas.

Senator VOINOVICH. Then you also have in your information, or to your knowledge, do you know where these LNG facilities are supposed to be built, or are projected to be built here in the United States?

Mr. GRUENSPECHT. In terms of receiving?

Senator VOINOVICH. Yes.

Mr. GRUENSPECHT. We do see a need for more terminals, but our crystal ball is not good enough to actually say exactly where they are. We do presume that there are some new terminals to serve the East Coast. We do have two terminals under construction on the Gulf that we assume are built and come into use.

There is some supply of liquefied natural gas both to Florida and Southern California, although exactly where those terminals are located, we cannot say. For instance, it is possible to locate in Baja, Mexico and serve Southern California, but we would not presume that. But we can certainly tell you what areas are served by liquefied natural gas.

Senator VOINOVICH. So the two things that I am concerned about is one, if the Middle East continues to be destabilized, the impact

that could have, and then recently someone said they were concerned that folks over there were concerned that we would build the terminals to take the liquefied natural gas. So the two come together in terms of speculating if that doesn't happen, what impact would that have on your projections.

Mr. GRUENSPECHT. We would be glad to provide that.

Senator VOINOVICH. I would also like to get from you if, for example, we got Lease 181, because it is an enormous amount of natural gas, with that kind of information, it really helps us in terms of our decisionmaking.

Senator Jeffords.

Senator JEFFORDS. Mr. Wehrum, I want to understand better what happened to your testimony. When did your testimony go to OMB?

Mr. WEHRUM. It began, the first draft went to OMB on Monday, Senator.

Senator JEFFORDS. Did you or your staff receive any direction from any member of this committee or staff not to produce written testimony?

Mr. WEHRUM. No, Senator.

Senator JEFFORDS. Did you or your staff receive any request to alter your testimony?

Mr. WEHRUM. The preparation of testimony, Senator, is a collaborative effort. It begins with EPA and we prepare our first draft of the document. But EPA is but one part of the Administration. So it is common practice when preparing testimony of this sort that it is submitted to other offices within the Executive, including OMB, including in this case DOE and others, so that they have an opportunity to review our testimony and make sure that our testimony is consistent with their understanding of these issues.

Senator JEFFORDS. Did that review result in changes?

Mr. WEHRUM. Yes, Senator.

Senator JEFFORDS. Mr. Wehrum, EPA has projected that implementation of its current set of Clean Air Act regulations will not lead to widespread fuel switching, is that correct?

Mr. WEHRUM. In preparing our testimony and preparing for this hearing, Senator, we focused on the impact of Clean Air regulations on the power sector. It happens to be the sector for which we have the most information and it seems to be the most highly relevant for purposes of the topic of this hearing.

After our review of the array of regulations that apply to the power sector already and those that will come to apply in the future, our assessment is that we expect some fuel switching has occurred as a result of our regulations from coal into natural gas and some fuel switching will occur in the future from coal into natural gas.

Our goal, particularly for the regulations we have adopted in the recent past, those that we have developed and implemented, was to maintain the fuel diversity within the power generating sector, while at the same time meeting our environmental responsibilities. We have sought to strike a balance and hit that sweet spot, so that we protect the environment and human health, but at the same time, we do it in the smartest possible way and in a way that is

designed to minimize impacts on the fuel diversity and the fuel choices within the power sector.

Senator JEFFORDS. If the Clean Air Act contributes to higher natural gas prices, would it be responsible to public policy to fail to implement the Act on that basis?

Mr. WEHRUM. Senator, as I said a moment ago, our projections, both our assessment of regulations that have been adopted so far and our projections with regard to regulations that have not yet come into effect but that have been adopted, such as CAIR and CAMR and the Cleaner Visibility Rule is that they will have small incremental effect on natural gas utilization within the power sector. We do expect some small amount of fuel switching out of coal and into gas.

So in answer to your question, our goal is to be as smart as we possibly can in implementing our regulations and in designing our regulations, so that where we do expect an impact, which we do expect with these regulations, we try to design it in such a way that it is not going to have a significant impact on the overall fuel variability and diversity within the power sector.

Senator JEFFORDS. If I understand your testimony correctly, it appears that the three main pieces of the Clean Air Act that apply to electricity generation do not appear to have substantially affected natural gas prices. Is that correct?

Mr. WEHRUM. Yes, Senator. Our assessment is that the regulations that have been implemented, as well as those that will be implemented, are going to have an impact on natural gas utilization in the power sector. We have projected that they will have an impact, therefore, on natural gas pricing. But based on the information we have available, we project the impact to be relatively small.

Senator JEFFORDS. Well, that is your projection, is it that future rules will also not have such an effect on gas prices?

Mr. WEHRUM. In the case of my testimony, I focused on CAIR and CAMR and the Cleaner Visibility Rule. Our projections are that we expect an effect, but the effects should be small, Senator.

Senator JEFFORDS. Thank you very much. I appreciate your answers.

Senator VOINOVICH. Senator Inhofe.

Senator INHOFE. Thank you, Mr. Chairman.

I am just as upset as anyone else is that we didn't get the testimony in advance as we were supposed to get, and all that, but let's don't carry this too far. During the Browner administration, we never had it in here. I remember Carol what was her name, Kay McKinty, is that right? Anyway, she was CEQ of the White House at that time in the Clinton White House. Senator Jeffords was chairman at that time. It was very rare we got anything in advance.

That doesn't excuse you, we need to have it, I think you have already expressed enough regret on that. So we don't need to beat that dog any longer.

Mr. Gruenspecht, you state in your testimony and I am reading here that stringent greenhouse gas limits could result in a major shift from coal to other fuels for electric generation. I think that is significant. I would like to have you give a little more detail about that.

Mr. GRUENSPECHT. Perhaps unlike some of the other emissions issues that have been dealt with in the Clean Air Act, mostly with technology, adding emissions controls—were there to be, say, a cap and trade program, and again, we are not advocating that it is just a description—were there to be a cap and trade program for greenhouse gas emissions that included carbon dioxide and were that program to involve a significant permit price, say, an allowance price for carbon dioxide, that would have a very significant impact on the delivered prices of different fuels, particularly coal, which is of the fossil fuels, the most carbon dioxide- or carbon-rich.

There are several studies that EIA has done in response to various requests I think from various members of this committee and others. So depending on what the program was and whether or not it had a safety valve, you could see very large impacts on relative fuel prices and those would have an effect, we project, on what fuel gets used in existing facilities and also what new facilities get built. So that is really where we are.

Senator INHOFE. OK. While I am asking this question, put our chart No. 2 back up, because I have another question I want to ask concerning that.

But I had a question I was going to ask a panel member of the next panel. But in light of some of the things that you said that were quite unexpected, at least to me, I would like to direct this at you instead, Mr. Wehrum. In a 2003 article, economist Lynn Keasling of the Reason Foundation and Richard Methune of the Federal Reserve Bank in Chicago wrote, “Air quality regulations have led to a situation in which the only economical way to build new power plants is to fuel the facilities with natural gas.” They further state, “This emphasis on natural gas as the way to achieve air quality improvements without dramatically increasing power generation costs has had the unforeseen consequence of reducing the resilience of natural gas markets.” Many others agree.

Are you seriously telling us by your testimony that the uncertainty caused by unclear New Source Review regulations has had absolutely no impact on the Clean Air regulations?

Mr. WEHRUM. No, Senator, that is not my testimony. If I may digress for one moment, to make a correction to an answer for Senator Jeffords, the testimony went to Interagency Review on Tuesday of this week, not Monday of this week, Senator Inhofe, and I apologize for that mistake.

Senator INHOFE. Very minimal impact, is that what you are saying? You said very minimal impact?

Mr. WEHRUM. In answer to your question, we clearly, “we” meaning EPA and the Clean Air regulations that we have developed clearly impose significant costs on the power sector. There is no doubt about that. The last estimates that I saw were that when constructing a new coal-fired power plant, anywhere from 20 to 30 percent roughly of the installation cost that goes into the project is the cost of the air pollution controls necessary to meet the standards that we have adopted.

So, that is not an insubstantial cost of installing and operating a facility such as a coal-fired power plant. Costs are similarly applied even to natural gas-fired power plants of the sort that have

been installed over the past few years. So we clearly impose costs on the industry, Senator, there is no doubt about that.

What I was attempting to convey is, well, let me say two other things. Part of the difficulty of putting this testimony together is, we are one factor, we being the Agency and the regulations that we implement. We are one factor of many that affect fuel availability, fuel supply and ultimately pricing. So we had great difficulty frankly trying to discern as best possible how much of an impact that we have had.

So my testimony is that we have evidence that we certainly have had an effect in terms of imposing costs, control costs, on the industry. We have had an effect in that we know that fuel switching has occurred for purposes of complying with our regulations and our standards. What we don't have is evidence indicating that those costs and those effects were a significant or a substantial factor in the supply issues that Dr. Gruenspecht has testified about, or the current pricing situation.

Senator INHOFE. Is it your intention to get that information, to develop it?

Mr. WEHRUM. We would certainly endeavor to do that, Senator.

Senator INHOFE. My time has expired, but I would like to have both of you look at this chart here. You heard my description of it first. This did not come from you, Dr. Gruenspecht, but do you agree in the conclusion that I have when you look at the spike in the price and the jobs dropping down that there is that relationship and it does exist?

Mr. GRUENSPECHT. You are referring particularly to 2001?

Senator INHOFE. That is correct.

Mr. GRUENSPECHT. There certainly seems to be a correlation there. Causation is again very tough to sit at the table and establish. So give me a chance to think about it, and perhaps I could get back to you for the record.

Senator INHOFE. That would be fine. I call it a no-brainer. But thank you very much.

[The referenced information follows:]

Natural Gas Prices and Employment.—The Energy Information Administration has not conducted any analysis of its own on the question of the impact of rising natural gas prices on manufacturing sector employment. A July 2005 Department of Commerce study “Impacts of Rising Natural Gas Prices on the U.S. Economy and Industries” (<https://www.esa.doc.gov/ngfr.cfm>) included the following statement:

“We found that higher natural gas prices in the 2000 to 2004 period had a somewhat mild depressing effect on GDP but a more serious negative effect on employment, especially outside of manufacturing. We estimated that in 2000 and 2002 these higher prices reduced real GDP growth by 0.2 percentage points in each of these years. For 2003 and 2004, the growth rate was unaffected. In terms of jobs, total civilian employment was lower by an average 489 thousand jobs in each of those years. Manufacturing employment was lower by an average 79 thousand jobs, about 16 percent of the total civilian jobs lost.

There is no clear evidence, except for nitrogenous fertilizer manufacturing, that higher natural gas prices were the primary reason for the poor economic performance of natural gas intensive industries during 2000 to 2004. These higher prices were certainly an additional burden on these industries, but their performance was already deteriorating prior to the onset of higher gas prices.”

Senator INHOFE. How about you, Mr. Wehrum?

Mr. WEHRUM. Senator, I am not in a position to answer the question.

Senator INHOFE. OK, thank you very much.

Senator VOINOVICH. Senator Jeffords.

Senator JEFFORDS. Mr. Gruenspecht, in your review, have you seen power companies planning for future baseload capacity in natural gas?

Mr. GRUENSPECHT. Our sense is that, as the testimony indicated, a lot of combined-cycle capacity was built. I think some people who invested in that capacity may regret that they have invested in it. But it was built, it was put in place, it is there. We do believe it will be used as electricity demand grows.

But we would think that under the fuel price conditions that we project, it would be less attractive to continue making those kinds of investments. There will obviously be some regional variation, and certainly we expect some new gas capacity to be built beyond what people already have. But again, a lot of what was built, we believe, was planned at a time—I have described what gas prices were like in the 1990's. The late 1990's is a period when a lot of that capacity was built.

We are projecting some relief in gas prices from where they are today. But as I said in response to an earlier question, we don't think gas prices are likely to get any place near where they were in the 1990's. Because of that, that technology is probably less attractive.

But you will find certain parts of the country where it would still be built.

Senator JEFFORDS. Some have claimed that high natural gas prices are the result of increased demand for natural gas in the power sector due to the Clean Air Act. Assuming for the purposes of argument the Clean Air Act did result in some increase in natural gas generation, can you tell us what effect that has had on current high natural gas prices?

Mr. GRUENSPECHT. What I would say is this. In the electric power sector, once you have gas capacity, and I know you are from New England and New England is an area that has built a lot of new natural gas capacity, demand in that sector is not very price-responsive because electric providers will understandably pay almost anything to keep the lights on, so to speak. So, as the electric power sector has become a major user of natural gas, and I did describe how that has increased, in addition to thinking about the level of natural gas consumption one has to think about the price responsiveness. In the case of electric power providers, their demand is not very price-responsive.

Residential demand is not very price-responsive. When it is cold, people use more. It is responsive to the weather, but it is not very responsive to the price. Generally people keep their house warm and they struggle with paying the bills.

So one thing that has happened with increased use of natural gas for electric generation is the proportion of total demand that is responsive to price is smaller. The industrial sector is one of the really few remaining places where demand is responsive to price.

So you have this supply that is not very responsive to price. You have the demand of the electric sector that is not very responsive to price. You have demand in the residential sector not very responsive to price. So when things don't add up, you see, No. 1, prices rising a lot, which is of great concern, obviously. No. 2, it ap-

pears that the equation gets balanced by adjustments primarily in the industrial sector. I think that is a description of what has been going on.

Senator JEFFORDS. In your testimony you note that between 1990 and 2005 coal generation in the power sector increased by 27 percent, which in absolute terms was larger than the increase in natural gas generation in the power sector. Assuming that is true, then doesn't it make clear that many electric power generators chose to continue using coal, rather than switching to natural gas, while continuing to comply with the Clean Air Act?

Mr. GRUENSPECHT. I think there is no doubt that the effect of the Clean Air Act has been to favor inherently cleaner fuels. So if you are comparing the world with the Clean Air Act to the world without the Clean Air Act, we think in the latter case you would see more coal than you are seeing, and less gas. But for the most part, the response of people who owned existing coal plants has not been to retire them. I cited retirement statistics; in fact, very few coal plants have been retired. The response of coal plant operators has primarily been to retrofit their facilities with emissions controls and continue to increase the utilization rate of those facilities.

Again, in 1990, the utilization rate was relatively low, for both coal and nuclear facilities, compared to what they are today. So that has been sort of a good news story, I think, in that we have been able to get more power out of the same baseload facilities.

But again, the nuclear plant utilization rate is now in the low 90 percent, it is not going to get much higher. The coal one has risen substantially. There may be a little room for it to get higher. But at some point, there does need to be new baseload. At a time when people thought gas prices were \$2 a million Btu at the well-head, people were thinking combined-cycle would be a good intermediate-to-baseload technology. With the higher natural gas prices, that is less attractive. We expect to see more coal plants built, despite the capital costs that Mr. Wehrum mentioned.

Senator JEFFORDS. Thank you very much.

Senator VOINOVICH. My theory is that Clean Air regulations exacerbated the demand for gas and I think some of our environmental policies limited the supply. So we had two things coming together.

In the process of doing that, you mentioned that in terms of price, the residential homeowner has to pay it because they have nowhere to go. The industrial user has some place to go, and they leave. In your study of what has happened, have you taken into consideration in your projections the tremendous loss in jobs that we have had in the manufacturing sector, particularly that sector that uses natural gas for feed stock, fertilizer, the chemical industry?

Your projections also show very, very tepid growth. In your projections, what are you looking at in terms of where manufacturing is going in this country?

Mr. GRUENSPECHT. As the question points out, there are certain areas of manufacturing, particularly fertilizer, certain bulk chemicals, that are very natural gas-intensive. For those types of activities, there is no question that the perception of what the price of

natural gas is going to be is critical to their location decision. There is just no way around that.

For other types of manufacturing activities, fuel costs would be one factor that would be important to them. There is no question that it is important. But there would be other factors that would also determine their location.

Senator VOINOVICH. Then your projections, if I'm not mistaking it, 1 percent growth, is that it?

Mr. GRUENSPECHT. Right. I need to go back and check, but certainly the growth in the energy intensive manufacturing, we see it as slower than the growth of the overall economy.

Senator VOINOVICH. I would be interested to see what your projections are for the next 10 years, vis-a-vis the previous 10 years in terms of where we were, to get a feel for just what is happening in terms of our economy.

Mr. GRUENSPECHT. I will get that for you.

Senator VOINOVICH. If you are capable of doing that.

Mr. GRUENSPECHT. I hope so.

[The referenced information follows:]

Energy-Intensive Manufacturing.—What are your projections for energy-intensive manufacturing industries and the overall economy for the next 10 years compared with the previous 10 years?

From 1995 to 2005, the overall economy grew at an annual rate of 3.3 percent per year, while energy-intensive manufacturing grew at an annual rate of 0.4 percent per year. While the economy experienced a recession in 2001 and slow growth in 2002, energy-intensive manufacturing was hit even harder, such that energy-intensive manufacturing showed almost zero growth between 2000 and 2005. However, in our Annual Energy Outlook projections, the growth rates are expected to increase from recent levels. Between 2005 and 2015, the projected annual growth rates are 3.1 percent per year for the overall economy and 1.5 percent per year for energy-intensive manufacturing.

Senator VOINOVICH. Good. I only have this comment, and that is that because we have not sat down as a Nation and looked at our energy economy and environment, and looked at cost benefits. I think Senator Jeffords and Senator Carper made very good points, and Senator Lautenberg. We have terrific benefits over on the health side. But we kind of look at things without, we just look at energy, I call them the silos. We go over here, we look at environment over here, we look at economy over here.

If somebody doesn't just sit back and look at this in terms of a long-range plan, how do you balance these up in terms of your policies that the Nation is going to undertake? What is your comment on that? Don't you think maybe it might be a good idea to start to look at the big picture and weigh all these things so we are doing things in a more rational way?

Mr. GRUENSPECHT. Is that for me?

[Laughter.]

Senator VOINOVICH. Yes.

Mr. GRUENSPECHT. For better or for worse, EIA—I have to describe it, and I have only been there 3 years—is a smaller picture Agency. Clearly, just as a citizen, as regards whatever I have done in the past in my life—I have worked in other types of positions and in academia—sure, there is a need to do that. The way we look at things at EIA, maybe it is self-serving, you can think of it as a marathon race where one group or one analyst has to do it all,

provide the whole integrated picture from beginning to end. Or you can look at it as a relay race.

At EIA, given the statute that created EIA, we do deal with a very particular part of it. So we don't deal with the health benefits, and while we might talk about emissions, but we don't talk about air quality, because we don't deal with dispersion modeling. Is there a need, as a citizen, would I be happy if people would look at that? Sure.

But EIA's mission is, I think, very valuable for looking at one piece of it very closely so that piece is not forgotten. You probably need some people who look at the whole thing in a less detailed but more holistic way. You probably need other people who look at individual parts in more detail.

So it is very hard to disagree, and I wouldn't disagree on a personal level. But I don't think the EIA, given its statute, is in a position to do that.

Senator VOINOVICH. The reason I raise it, I recall that when I was Mayor of Cleveland, and perhaps, Senator Inhofe, when he was Mayor of Tulsa, we would have all these programs to create jobs in the city, Federal programs. Then we had the Environmental Protection Agency, which had these new regulations that made it more difficult in terms of manufacturing.

I kept asking myself, do these people ever sit down and talk to each other and figure it out? I have to tell you something, we really have to think about that, I think, as a country. If we don't start, and I talk about the infrastructure of competitiveness, we have to start to think of things differently than we have in the past.

If we keep doing the silos, that is, you do your thing, somebody else does another, we are in real deep trouble. Because the competition out there is more formidable than ever before. We could perhaps be a little bit lax in some of the things we are doing. I think we are at the stage right now where if we don't get on this thing pretty rapidly, it is going to really have a dramatic impact on the standard of living of our people in this country.

I have no other comments.

Senator Inhofe.

Senator INHOFE. I just want to, I was shown by my staff in this publication that we actually put together the quote by Alan Greenspan when he said, "We have been struggling to reach an agreeable tradeoff between environmental and energy concerns for decades. I do not doubt that we will continue to fine tune our areas of consensus. But it is essential that our policies be consistent."

Do you agree, Dr. Gruenspecht, that our policies are not consistent right now? I'm having a hard time here, Mr. Chairman.

Mr. GRUENSPECHT. Well, again, given where I come from, we generally don't take positions on policy. But I will say that yesterday, Mr. Greenspan's former lead person on energy joined the Energy Information Administration.

Senator INHOFE. Well, you might go back and ask him and then get back to me.

Mr. GRUENSPECHT. I will go back and have a discussion with him.

[Laughter.]

Senator INHOFE. Give me the answer for the record, then.

Mr. GRUENSPECHT. Thank you, sir. I appreciate your letting me squeeze away.

[The referenced information follows:]

It is certainly the case that some Federal policies have tended to increase demand for natural gas, at the same time as other Federal policies have served to constrain natural gas supply. In combination, the result has been that natural gas prices have been higher and more volatile than otherwise would have been the case. It is to be expected that these policies have had these implications. In this vein, Alan Greenspan noted in 2003 that:

"We, in the United States, have long struggled to reach an agreeable tradeoff between environmental and energy interests in our public policy debates. This process will no doubt continue. Through it, we must reach policies that strike a balance among competing concerns while avoiding inconsistencies. For example, we cannot, on the one hand, encourage the use of environmentally desirable natural gas in this country while being conflicted on larger imports of liquefied natural gas (LNG) on the other. The result of such contradictions are debilitating spikes in prices."

He also has noted the following: ". . . there are still numerous unexploited sources of natural gas production in the United States. We have been struggling to reach an agreeable tradeoff between environmental and energy concerns for decades. In a sense, there are two value systems, the economic value system and the environmental value system, and there is no mechanistic tradeoff. As an economist, I cannot provide a clear mathematical formulation to allow you to compute that tradeoff; this is a judgment that the Congress will have to make."

Senator VOINOVICH. We want to thank you very much for being here this morning. Mr. Wehrum, I know the next time you come back, we are going to probably have that testimony a week before.

[Laughter.]

Mr. WEHRUM. Signed, sealed and delivered, Senator.

Senator VOINOVICH. Thank you.

Our next panel we have testifying, we thank you panelists for being here. Arthur Smith, who is testifying on behalf of the American Gas Association. He is the senior vice president and Environmental Counsel for NiSource. Mr. Joel Bluestein, who is president of Energy and Environmental Analysis. Jack Gerard, who is president and CEO of the American Chemistry Council.

Mr. Smith, we will begin with you.

STATEMENT OF ARTHUR E. SMITH, JR., SENIOR VICE PRESIDENT AND ENVIRONMENTAL COUNSEL, NISOURCE, INC., ACCOMPANIED BY: PAUL WILKINSON, AMERICAN GAS ASSOCIATION

Mr. SMITH. Thank you, Senators. Good morning. My name is Arthur Smith. I am senior vice president and environmental counsel with NiSource. NiSource, Inc. is a member of the American Gas Association. NiSource is the parent company name. It does have an electric power company in Indiana and natural gas companies serving 3.7 million natural gas customers, including 1.4 million natural gas customers in Ohio. As a matter of fact, in 66 out of 88 counties in Ohio, it goes under the name of Columbia Gas of Ohio.

As has been pointed out, natural gas markets have been extremely tight in the last 5 years with supply unable to keep pace with rising demand. New supply initiatives are critical to correcting this imbalance. But demand side actions are also necessary, particularly on the efficient use of natural gas for electricity generation.

There is no doubt that increased natural gas demand from the power sector has contributed to the natural gas price volatility. As

has been pointed out, from 1999 to 2005, there was significant installation of natural gas-fired combined cycle plants as well as lower efficiency peaking plants.

While most of this capacity is outside of EPA's trading programs, it is certainly true that easier environmental permitting for these gas-fired units contributed to this growth. Other factors, such as energy markets, the low capital cost for the equipment and the then-low natural gas prices, also caused this growth. New coal-based generation was generally discouraged by environmental regulatory costs as well as the uncertainty in terms of the future requirements.

As a result, electricity, power companies have increasingly relied on less efficient natural gas peaking technology to meet increasing power demand. This trend of increased natural gas usage will likely continue until there is significant investment in new fuel diverse, baseload power capacity, including increased market penetration of efficient coal technologies, solar, wind and efficient natural gas combined heat and power systems.

As an example, with our power company, NIPSCO, since about 2002, NIPSCO invested \$250 million in pollution control equipment to comply with EPA's trading programs. Without adding any new generation capacity, NIPSCO did increase its natural gas usage during this period. I suspect that is fairly typical from the power utility sector.

New generation and energy efficiency that would reduce this natural gas usage is not encouraged within EPA's trading programs for those plants larger than 25 megawatts. Moreover, if there is a desire to increase baseload generation with lower carbon intensity, the efficiency of the new generation needs to be significantly higher than the coal generation technologies currently in the permitting stage.

I agree with you, Senator, that public policymakers must certainly consider both energy and environmental goals when developing regulations that impact the electricity generation sector. That is environmental goals must be achieved in concert with pursuit of greater fuel diversity generation and energy efficiency in the electric generation mix.

Thank you.

Senator VOINOVICH. Thank you.

Mr. Bluestein.

STATEMENT OF JOEL BLUESTEIN, PRESIDENT, ENERGY AND ENVIRONMENTAL ANALYSIS, INC.

Mr. BLUESTEIN. Thank you, Mr. Chairman and members of the committee, for the opportunity to testify today. My name is Joel Bluestein, and I am the president of Energy and Environmental Analysis, Inc., located in Arlington, VA.

There is a common belief that the recent boom in gas power plant construction is the cause of increased gas consumption for power generation, that the recent focus on gas-fired power plants is due primarily to environmental regulations, and that if we could just change the existing environmental regulations, there would be a big shift to coal-fired power plants, gas consumption would go

down and gas prices would go back to \$3. Unfortunately, there is little data to support these suggestions.

The historical data clearly show that gas-fired electricity generation has been increasing continuously and at about the same rate since at least 1990, well before the recent boom in power plant construction and the increase in natural gas prices. Despite the construction of over 200 gigawatts of new gas-fired capacity in the last 6 years, the growth rate of gas-fired generation has not increased. In fact, it declined slightly from 2002 through 2004.

Not only have the new gas power plants not increased gas consumption, they actually have reduced gas consumption relative to what would have occurred in their absence. This is because many of the new plants were built in regions that were already dependent on older, less efficient gas power plants. In these regions, the new, more efficient plants have displaced the older, less efficient power plants, reducing the amount of gas that would have otherwise been consumed.

This increased efficiency has reduced natural gas consumption for power generation by about 1 trillion cubic feet in 2004, about 15 percent lower than it would otherwise have been. That said, there are some States in which utility regulations are allowing incumbent utilities to continue to use older, less efficient plants, while new, more efficient plants sit idle or under-utilized. Remediating this situation is one way to rapidly reduce the amount of gas consumed for power generation.

The question raised in this hearing is whether or how much Clean Air regulation has led to the increased use and construction of gas-fired power plants. In fact, air regulation is only one of many drivers for the use of gas, and probably not the most important one. Our environmental regulations do not single out gas for priority treatment. The most significant differentiation between fuels historically has been to set less stringent limits for coal plants than for gas plants.

While gas plants are cleaner than coal-fired plants, our environmental regulations set more stringent limits for cleaner plants, such that the cost per ton of NO_x control for new natural gas plants can be higher than the equivalent cost for new coal plants. In addition, many of the recent environmental programs have been cap and trade programs, which provide great compliance flexibility, and are designed to avoid forcing the shutdown of older, high-emitting plants. Both the EIA and the EPA have done numerous studies, both retrospectively and prospectively, to look at the effect of these programs. It has been found that the effect on fuel switching is very small.

If anything, these programs have under-valued the efficiency and low emissions benefits of gas-fired plants by providing them with fewer trading allowances than provided to coal plants with the same output. So gas plants are not getting preferential treatment on emission regulation.

The recent generation of gas power plants was planned during the late 1990's and was built by independent, non-utility power developers expecting to compete in a restructured, competitive power market. There was a premium on being the first plant into that market. Natural gas prices were below \$3. Combined with a low

capital cost, about half the cost of a coal plant, high efficiency, short construction time, smaller footprint, more flexibility in locating, more operational flexibility and other advantages, gas plants were the obvious choice. Any plausible change in environmental regulation would have had little effect on the choice of gas technology over coal at that time.

The economics of new plant construction have changed significantly now. Higher gas prices have resulted in higher electricity prices, creating a very high value for coal-fired generation. The U.S. Department of Energy is currently tracking about 135 planned or proposed plans comprising 80 gigawatts of new coal generation. While not all of these proposed plants will ultimately be built, all of them are designed to cost effectively meet the current emission requirements for conventional pollutants.

In discussing the construction of new coal plants, it is commonly asserted that passage of the Clear Skies Act will facilitate the construction of new coal plants by providing certainty regarding regulation of conventional pollutants. While this is true, it ignores the fact that uncertainty over future regulation of CO₂ emissions is an even larger impediment for potential builders of coal plants. An increasing number of power companies are making clear that they cannot commit to investment in new coal plants without reasonable certainty on their future CO₂ liability. They are suggesting that it may not be less regulation, but more comprehensive for pollutant regulation that would help accelerate the construction of new coal plants.

Coal continues to be the backbone of our electricity supply system and increased use of clean coal generation is one important component of a response to high gas prices. However, environmental regulation has not been the primary reason for the recent growth in gas generation and going forward, environmental regulation can actually encourage increased coal use if it addresses CO₂ as well as conventional pollutants.

Given the importance of the natural gas supply demand issue, we need to focus on near-term supply and efficiency responses that can provide benefits in the shorter term. Thank you, and I will be happy to respond to questions.

Senator VOINOVICH. Thank you, Mr. Bluestein.

Mr. Gerard.

**STATEMENT OF JACK N. GERARD, PRESIDENT AND CEO,
AMERICAN CHEMISTRY COUNCIL**

Mr. GERARD. Thank you, Mr. Chairman, Senator Inhofe and Senator Jeffords. It is a pleasure to be here today. We appreciate the opportunity to testify on behalf of the 900,000 men and women in the business of chemistry in the United States, an industry that is essential to our economic well-being as well as our national security.

I would like to focus my comments today on the consequences of high natural gas costs on the chemical industry and by extension on the manufacturing sector generally. Chemistry consumes more than 10 percent of the Nation's natural gas. We use it to run our plants and it is the key ingredient in the products we make. Since our products are found in 96 percent of all manufactured goods, it

is safe to say that natural gas is a key ingredient to the Nation's manufacturing economy.

Last year, the Nation's natural gas bill topped \$200 billion for the first time in history, as compared to \$50 billion in 1999. Higher natural gas costs, according to the National Association of Manufacturers, are a major reason why the Nation has lost 2.9 million manufacturing jobs since 2000. In a few short years, the United States has gone from having some of the lowest natural gas costs in the industrialized world to the highest cost market. The impact has been staggering.

In a few short years, the U.S. chemical industry has lost more than \$50 billion in business to overseas operations and more than 100,000 high paying jobs in our industry have disappeared. Put another way, the chemical industry went from posting the highest trade surplus in the Nation's history in the late 1990's to becoming a net importer in 2002.

Other impacted industries include forests and paper, agriculture, aluminum and steel, carpets, bedding and furniture. They all have a similar story. For example, since 2002, 36 percent of the U.S. fertilizer industry has been shut down or mothballed. Since 2000, the forest products industry has closed 232 mills, lost 182,000 jobs or roughly 12 percent of their entire employment.

How did this happen? When you look at the data, the answer to us is quite clear: too little supply being chased by rapidly increasing demand. For example, since the 1990's, there has been a 35 percent spike in natural gas consumption by the utility sector. That is 1.5 trillion cubic feet of new demand. In that same period of time, domestic natural gas production remained flat, or as the chart showed earlier, has actually declined.

Existing sources of supply were unable to meet new sources of demand. When the supply response was needed, it didn't come. To us, the real failure of Government policy was that it did not open up new sources of natural gas supply to meet demand growth. Government stood by while short supplies of natural gas led to a price bidding war that drove more than 10 percent of the industrial demand out of the market, referred to earlier as demand destruction.

For too many years, U.S. policy has been trying to have it both ways. It can't continue. It is failing millions of Americans whose livelihoods depend on reliable supplies of natural gas at affordable prices. The high price of natural gas is driving the global chemical industry out of the United States. For example, today there are more than 120 world-scale chemical plants, plants that cost more than \$1 billion apiece, that are under development around the world. Only one of those is slated for the United States.

Business Week calls it the hollowing out of the Nation's industrial core. By contrast, 50 of those 120 new chemical plants are being built in China.

That is why it is so frustrating to us as an industry to see proposals in Congress that would extend the off limits signs in the outer continental shelf out to 150 and 250 miles off Florida's coast, even as Cuba is hiring Chinese energy interests to explore and drill for energy in waters that are barely 45 miles off the Florida coast. It is time for a change. It is time to strive for balance and reason.

Senator Voinovich, to your point earlier, we need to harmonize our policy in the United States to protect our economic well-being. Three quick suggestions we believe the Congress can do. First is to continue to curb demand through efficiency and conservation. Second is to diversify our fuel sources. In the 1990's, natural gas-fired power generation emerged as a technology of choice. Today there are other good choices, advanced clean coal, nuclear power, renewables and others.

Last, we need to increase supply. We can no longer escape the fact that our Nation's currently available supply of natural gas can no longer meet the Nation's growing demands. We must increase access to new sources of supply that are currently off limits to use.

In conclusion, the issue is restoring balance to the U.S. natural gas policy in a way that helps manufacturers compete in global markets, permits utilities to branch into leading edge technologies and ensures a reliable and affordable supply of natural gas for America's homes and businesses.

Thank you again for the opportunity to testify. I am happy to answer any questions.

Senator VOINOVICH. Thank you, Mr. Gerard.

We are going to have at least one set of questioning for 6 minutes for each of us. I would like to take my 6 minutes and give each of you 2 minutes to comment upon what you have just heard here. Mr. Bluestein, Mr. Gerard, Mr. Smith, you have heard each other's testimony. I would be interested in any other additional comments that you would like to make before this committee.

Mr. SMITH. One thing I would like to point out is the importance of the natural gas for heavy manufacturers like members of the American Chemical Association. A lot of these plants and many more have the capability of not only using natural gas for feedstock, but for very efficient onsite generation of electricity supplies. A lot of your members, Jack, I am sure, have this kind of onsite generation, which is a very efficient form of using natural gas for power generation.

It is also important for their economic well-being, because they can moderate their price, expected price of energy costs. It also keeps them in the country if they make that kind of investment.

One of the ways that that can be linked up to EPA's trading program is to allow increased flexibility for the power companies to buy the electricity coming from the onsite generation, because you get the benefit of increased power coming into the electric grid system, as well as the ability to offset some of the financial costs of the onsite generation. That kind of linkage of power generation outside of each of EPA's trading programs can be brought into the trading programs, so investment capital can flow into that kind of capital.

Senator VOINOVICH. Mr. Bluestein.

Mr. BLUESTEIN. Thank you.

I think there is no disagreement here about the concern over high gas prices. I think everyone understands that. I think in particular, the concern for the effect on consumers and industry and businesses, I don't think there is any disagreement about that.

I think even most of the solutions we agree on, and all the Senators have listed a wide range of solutions, of different kinds of

supply options, energy efficiency. I don't think anybody disagrees that we need to make better use of our coal resources through new clean technology.

I think the issue today is how important is environmental regulation in that list of responses to the natural gas price issue. I guess my message simply is, I think it is pretty low on the list. I think of all the things that we have listed today, it is probably the lowest on the list, and at best, it is a mid- to long-term response. Any new power plants built today are not going to come online for 5 or 10 years.

So there are more effective things, there are quicker things. I think those are the ones that we need to focus on. Because those are not so easy to do, either. I think that is my basic message.

Senator VOINOVICH. Mr. Gerard.

Mr. GERARD. Mr. Chairman, if I could add just another thought or two on the consequences of what we are seeing in our industry, and again by extension, to the whole manufacturing sector. I am not sure we fully appreciate the ripple effect that these fundamental decisions or choices have across our entire economy. Every job created in the chemical industry, for example, has a multiplier effect of 5.5 jobs in other industry sectors.

One of the things we have often talked about in our sector is what we refer to as the brain drain, or the impact we are having on sciences, the engineers in this country and others. As we move our facilities overseas, one particular company that is a U.S.-based entity, has been here for many years, has just built a multi-billion research and development facility in China. They hire Chinese engineers, Chinese scientists and others to do the R&D that typically would be done on our shores with our scientists, engineers, et cetera.

Today the chemical industry is second only to the defense industry in the amount of money we spend on research and development. Annually, we spend \$22 billion for research and development in this country as an industry. One out of every eight patents that is issued by the patent office goes to our industry.

We have multiplier effects up and down the entire economy. When you look at the business of chemistry, we impact close to 26 percent of the entire employment in the United States.

So when we are pushed offshore by matters like natural gas prices, we are taking those multipliers, we are taking all that activity that we once did here in the United States, and we are siting it in China, we are siting it in the Middle East, we are siting it wherever we can get our feedstock at a reasonable price.

Dow Chemical's chairman testified a few months ago here in the Senate Energy and Natural Resources Committee. He had a \$4 billion facility slated for Freeport, TX. Due to natural gas prices, that facility has now been moved to Oman. Why? Because the natural gas price is killing them. They will take with them their research and development people, the scientists and others, and will hire those in other parts of the world.

So I think there are much bigger impacts here than just finding affordable natural gas for the chemical industry or others. We need to think about our basic R&D capability, the technology development that we have that comes from industries like ours. So I would

hope that would be part of this harmonization or understanding of how we harmonize policies in the United States to protect our economic and national security interests.

Senator VOINOVICH. I just wanted to comment that the report that was asked for by two of our Senators from the National Academy of Sciences emphasized that. We're talking about the brain drain, and we're not producing the scientists and engineers that we need in the country. They tied that in with the whole issue of energy independence, how the two go together. I think you have brought that pretty clearly to our attention.

Senator Jeffords.

Senator JEFFORDS. I defer to Senator Inhofe.

Senator INHOFE. Mr. Chairman, Senator Jeffords has kindly agreed that if I only just take 2 minutes instead of 6, I can go ahead. I have to go back to the office.

First of all, I think there are some things we all agree on. We do have a crisis. We need all of the above, nuclear, clean coal technology, renewables. That is what really our effort here is.

The question, I have two quick questions, real quickly. One would be, for Mr. Gerard, that according to Mr. Bluestein's testimony, uncertainty with respect to mandatory CO₂ control inhibits more coal use. In your opinion, if the United States were to ratify the Kyoto Treaty, would your industry most likely benefit, or would the strains that you are already experiencing increase even more?

Mr. GERARD. We think the strains would increase even more.

Senator INHOFE. Second, I would like to, I couldn't seem to get anyone to agree, it seems to be pretty obvious to me, on my chart No. 2, does that make sense to you, that there is a relationship between the price of natural gas and—

Mr. GERARD. Well, like you, Mr. Chairman, having lost 100,000 jobs in our industry directly related to that increased natural gas price, we believe there is a direct correlation. Like you, we think that is a no-brainer. It is clearly happening.

Senator INHOFE [continuing]. Thank you, Mr. Gerard, and thank you, Senator Jeffords, Mr. Chairman.

Senator VOINOVICH. Before you go, we talked about this harmonizing. I would like to suggest that perhaps you talk to the leader and maybe Senator Jeffords could talk to his leader, about perhaps getting a group of us together from both this committee and the Energy Committee, to sit down and start to look at this whole picture as to how do we harmonize, new regulations versus the need for more energy, so that we could come back with some kind of maybe a comprehensive recommendation on how we deal with this current crisis that we have, recognizing that we want to maintain, continuing to improve our environment and public health.

Senator INHOFE. I think that is an excellent idea, and I would certainly do that. Thank you, Mr. Chairman, thank you, Senator Jeffords, for letting me go ahead here.

Senator VOINOVICH. Thank you.

Senator Jeffords.

Senator JEFFORDS. Mr. Smith, all four of your recommendations about how we might best meet America's natural gas energy demand all relate to increasing supply. Do you have any other rec-

ommendations on how prices could be reduced from a demand side approach or otherwise?

Mr. SMITH. The written testimony that you are probably referring to did spend a lot of time on the supply side of the equation.

Senator JEFFORDS. Yes.

Mr. SMITH. In my oral testimony, I also indicated the importance of the focusing on the demand side, particularly as it pertains to the power sector. Because that is the incremental growth that has put increasing pressures on natural gas volatility.

That is where I think, and that is where I spent my time in my oral testimony, talking about the importance of encouraging new, efficient baseload and having the environmental regulations give credit for energy efficiency. Because I think with that kind of signal, there will be more signals for using natural gas at a higher efficiency which will reduce that demand.

Most of the natural gas-fired plants during that 5-year window, up to 2005, were either simple cycle turbines at 30 percent efficiency and combined cycle at 60 percent efficiency. Well, with the diminution of the market for the 60 percent efficient plants, because of the high price for natural gas, you know, unfortunately a lot of the natural gas being utilized by the power sector is being consumed at 30 percent efficiency. That is very low on the scale, considering that you can get up as high as 80 percent efficiency with combined heat and power systems.

So I think that demand equation, it is the utilization of natural gas, can be as important as some of the supply options.

Senator JEFFORDS. You mentioned a number of factors affecting natural gas prices, including weather, the mature nature of existing gas fields, and demand side issues, such as increased use of natural gas for electricity generation. Do you favor relaxing environmental regulations, including Clean Air Act regulations, as a means of reducing natural gas prices?

Mr. SMITH. No. No, I think the pollution control requirements are critically important for the country. However, the stringency needs to be related to how it gets done. How it can get done can count clean, new baseload capacity and energy efficiency to accomplish the same environmental goals, but reduce the natural gas demand.

For many historical reasons, the Environmental Protection Agency has never counted energy efficiency as a way of achieving an environmental objective. They are starting. But even though there has been a lot of talk about pollution prevention, why energy efficiency pollution prevention hasn't been incorporated into the base Clean Air Act programs remains a mystery.

Senator JEFFORDS. Thank you.

Mr. Bluestein, in your testimony, you state that future carbon dioxide regulation might actually accelerate the construction of new coal plants. Would you elaborate on that for me?

Mr. BLUESTEIN. As I said, we are starting to hear more and more power company executives, and we heard a lot of this yesterday in various events, say that it is very difficult for them to commit to construction of new coal-fired power plants that are going to be around for 40 or 50 years without having some certainty on how those are going to be treated on CO₂.

They are not suggesting that the United States implement the Kyoto Protocol. But they are looking to other, more recent proposals, including some that have been proposed in the Senate, that look at very gradual reductions, sometimes using various kinds of economic safety valves, that would let them know where they are headed and allow them to make investments and to find the investment capital. It is not just the companies, it is the investors who have to put up the money and are concerned about whether that is going to be a good investment.

So there are starting to be proposals that start to address the issue, but also give industry and the investment community some comfort that we can do this in a reasonable way and would allow companies to go forward with more construction of coal plants.

Senator JEFFORDS. Again to you, what evidence is there that the increased demand for natural gas in the electricity generation is a substantial factor in current high natural gas prices? Aren't there other factors that impact the price of natural gas to a greater degree?

Mr. BLUESTEIN. Well, like anything, the price of gas is dependent on a lot of factors. For example, it is related to the world price of oil. Last year, we saw the price of gas increase from the spring, around \$6 to just before the hurricanes about \$8. A lot of that was due to the high world price of oil.

Certainly the increased demand for natural gas from the power sector is one important piece of the gas price issue. I wouldn't say that it is not important. But there are other factors as well, including the supply side. Again, the gas price issue has a lot of different factors. I think the key is which ones are most significant and which ones can we most quickly and effectively influence.

Senator JEFFORDS. Thank you, Mr. Chairman.

Senator VOINOVICH. Thank you, Senator Jeffords.

Mr. Smith, when you were testifying, you were talking about the fact that, why did we go to natural gas. You did mention easier permitting, low capital costs and low gas costs. We have had a big debate in this committee over New Source Review. We are trying to get some kind of certainty in regard to its importance to knowing what is going to be expected.

What impact, from your perspective, has this uncertainty about New Source Review had on decisions that were made in terms of natural gas?

Mr. SMITH. Well, in permitting, the smaller natural gas generation, of course, you have to go through New Source Review. Typically that is a process that well understood and you do the analysis and that process for new generation has not been a real impediment. I think it has slowed some of the newer natural gas-fired generation, but it hasn't been a block to that new generation. That is one reason why the ease of permitting caused a lot of that type of generation to come into the market.

Where it has had more of an effect is the application of New Source Review for existing generation, which is the bulk of the baseload capacity in the country. Most of the new gas generation is intermittent and peaking. So New Source Review, as it is applied for the bulk of the baseload generation, has had an impact, because that is when you get into the debate on the interpretation of when

you trigger New Source Review. I think it is probably a true statement that because of that uncertainty there have not been a lot of efficiency improvements in the existing generation fleet, and therefore that extra amount of baseload capacity has not come into the market.

Senator VOINOVICH. I have heard complaints about, the fact is that I want to make my plant more efficient and bring my costs down, but I have an unimaginable line to go through in terms of regulations. So you just throw up your hands and say, we are not going to do it. I think your emphasizing efficiency is something that we ought to start to pay more attention to.

You have a lot of customers in Ohio.

Mr. SMITH. Yes, sir.

Senator VOINOVICH. I was lucky that through our local gas company, somebody signed me up, I had an opportunity to sign up for \$8 per MCF. I remember when I did that for 3 years, and my wife said, you're crazy to do that. I said, no, I don't think I am. We have a lot of people that are paying \$12 and \$13 per MCF.

What is your company telling these people about how those costs are going to come down? That is the big question I have, everywhere I go. My natural gas costs are eating me up, even, look, I am in a modest, middle class neighborhood. Even the restaurants are saying because of oil costs and because of natural gas costs, people are not coming in and eating any more. One woman said, I think I am going to have to go out of business, Senator.

What are you telling people? What do we need to do to bring them down as soon as possible?

Mr. SMITH. Sir, with demand and supply, on that knife's edge, it has caused very large price swings with very small events. As you know, before this winter, we had larger events with the hurricanes. We have been increasing our communications with our customers to conserve, to be careful about what they use. We have tried to get them to sign up to fixed price programs, like you had the foresight to do, as well as encouraging programs to help the lower income people for their payment for natural gas.

But these are short-term things.

Senator VOINOVICH. The thing is, they are looking down, what is it going to be next year or the year after, and what things have to happen for that to occur. Right now, LIHEAP, we don't have enough money for LIHEAP. The fact of the matter is, we need more money.

Are your companies saying to our folks at the Office of Budget and Management that hey, we need some more money in this area, because we have a lot of folks out there that are going, you know.

Mr. SMITH. I believe the American Gas Association has been active in that regard. But as you say, this is just a short-term situation. The important question is how we get more supply and demand efficiency so we can get off of that knife's edge that is causing the pricing volatility. That is the long-term answer.

Senator VOINOVICH. Would you be talking, the American Gas Association, telling the President to go forward? I understand he has the authority to go forward with leasing 181. We have a bill in that does it, another bill from two Senators from Florida that says we shouldn't do it. But I thought the Administration could do that.

What options are available right now without getting legislation to them to increase that supply?

Mr. WILKINSON. Senator, my name is Paul Wilkinson. I am vice president for Policy Analysis at the American Gas Association. We would agree with you that Lease Sale 181 should go forward as quickly as possible. Given the supply constraints that we have heard about this morning and the impact on the industrial sector that has been talked about this morning, and given the fact that you cannot drill for gas off the East Coast of the United States, you can't drill off the West Coast of the United States, you can't drill in the Eastern Gulf of Mexico, you can't drill in much of the Rocky Mountains, we don't have a pipeline down from Alaska, we have not completed a new LNG import facility in three decades, we would like to see action on all those fronts.

We are very aggressive supporters of LIHEAP, that is a stop-gap measure. The efficiency side of the equation is being addressed. The average residential natural gas consumer in this country consumes 25 percent less gas per household per year today than it did in 1980. Homes are tighter, equipment is more efficient. We have applications in the industrial sector that used to be 30 percent efficient, now they are 99 percent efficient.

So because of these prices, people are moving aggressively forward on their own to increase their energy efficiency. The bottom line is that we will not see moderation in prices and stability in prices until we increase supply.

Senator VOINOVICH. I have taken probably more of my time than I want, but without objection, I would like to have—what is your name again?

Mr. WILKINSON. Paul Wilkinson.

Senator VOINOVICH. Paul Wilkinson, that you submit to us your best thoughts on what it is that we can do to get this supply up and what impact you believe it might have on my answering the lady that runs Marta's Restaurant that maybe some of her customers might come back here in the next year or so, because there is some hope that their natural gas costs are going down. Would you do that?

Mr. WILKINSON. Certainly, Senator.

Senator VOINOVICH. Is that all right with you, Senator Carper?

Senator CARPER. Yes.

Senator VOINOVICH. We would like to have you submit that to us. Thank you.

Senator Carper.

Senator CARPER. Thanks, Mr. Chairman. To our witnesses, I apologize for slipping out of here. Senator Voinovich has spent a fair amount of time trying to figure out how to make our country more competitive with the rest of the world. Part of it is a world class, educated work force and making sure our kids know how to read, write, think, do math and science stuff when they come out of our schools, go out into the work force. Part of it is trying to figure out how to make us more competitive on health care. We spend a whole lot more money than the rest of the world on health care. Frankly, outcomes aren't any better in a lot of instances.

I have been looking at health care information technology, Mr. Chairman, trying to figure out how to save costs and save lives on

that. I am pleased to be able to come back before you and finish up here.

I am going to ask each of you to give me a takeaway, because I missed your comments. I am going to read your prepared testimony. But I want to ask each of you to give me a takeaway that, if you remember nothing else today, Senators, remember this point or maybe two.

But I have a specific question, if I could, for Mr. Smith. In testimony, I want to say 3 years ago, before, I think it was the House Committee on Energy and Commerce, a fellow named Jeff Curry, who was the managing director of Goldman Sachs at the time, may still be, but he stated, "The core problem with the U.S. natural gas market is inadequate infrastructure." I think he went on to say, "Although public attention has been focused on the ability to grow the natural gas supply," and we have talked about that, heard about that just a moment ago, he said, "the underlying storage and transportation are the primary constraints on both supply and demand growth."

So I guess what I want to ask you is, do you agree that the lack of natural gas infrastructure is having a significant impact on natural gas markets? Second, if we had more supply today, do you think we could move it to where it is needed? We talked a little bit about this pipeline from Alaska and this area off of Florida. But in Congress, I support, I know Senator Voinovich has supported the construction of this new pipeline from Alaska. But is there more we could be doing to bring that project or other projects to market?

If you could just take maybe a minute or two on that, I would be grateful.

Mr. SMITH. With the new areas of natural gas supply, you are going to have a shift of where you have to bring the supply into the existing distribution system in the United States. So with that shift, you do have to have additional natural gas transmission to bring that new supply to market.

I know AGA, as well as INGA, has been very involved with what has become a fairly lengthy process of getting the permitting to put in the transmission pipeline. I know our company is looking to build a pipeline in New York State, we are one of the equity partners in that, called the Millennium Pipeline, which is one of those pipelines that would allow the Canadian natural gas to come in to the New York area, all the way down to one of the more constricted metropolitan areas, the New York metropolitan area.

That pipeline has been in the permitting stage for about 8 years. It is increasing, with the pipeline coming through, into an urban area, it maybe a 1,000 mile pipeline, but if there is 2 miles coming through a developed neighborhood, that presents a challenge. Because there is considerable public input into the construction.

So we have been looking, and I think we have testified in front of committees about how you can get the public input into the NEPA evaluation up front and quickly, and then come to a decision, rather than—because that delay, if you come up with new supply and you don't have the ability to bring in the natural gas through a transmission pipeline, you still don't have the supply.

Senator CARPER. All right. Thank you. I am going to come back to you for a closing thought, a takeaway, if you will. But I am going to move over here to Mr. Gerard and ask if you would give me a good takeaway. If you think of all the stuff that you've said or maybe others have said that you think we ought to take home with us, what would it be?

Mr. GERARD. From our vantage point, Senator, as we talked earlier about job loss in the industrial community, in the United States, which has been significant over time, first and foremost, we think the quickest, shortest term answer to a lot of this is to increase supply. There has to be conservation and there has to be improvements in efficiency. In our industry, we believe that makes good business sense.

Last year, we gave awards to 11 companies who improved their power efficiency such that those 11 companies saved enough energy to heat and power Minneapolis for 1 year, that's 11 companies. So we believe efficiency and conservation makes good business. We are on that road now. But we can't do it on our own.

Secondarily, and perhaps more importantly today is, we have to increase supply. We believe the 181 debate is a good start. But that is not a long-term policy. That will provide us 5 TCF roughly, in a market that consumes about 22 on an annual basis. But longer term, we have to adjust our energy policy in this country. We are the only developed Nation I am aware of that denies access to our vast energy resources.

It is frustrating for industries like ours to see what is going on in Cuba today. Ninety miles off of our coast, they have hired and have contracts with the Chinese. Because of our understanding with the Cubans, they are drilling within 50 miles of our coast. Yet the debate in the Congress is over locking up another 150 to 250 miles off the coast of Florida. To us, it doesn't make a bit of sense. It is illogical and we wonder why we are all going to other places in the world to build our facilities.

A quick signal to the marketplace that we are going to open up 181 in the short term and develop a longer term gas policy that is going to provide the stability we need, we believe, will be the signal the market needs to moderate gas prices in the short term.

Senator CARPER. Good. Thank you.

Mr. Bluestein.

Mr. BLUESTEIN. I think there is agreement across the board here about the importance of addressing natural gas prices. We have heard many ways to approach that through increased supply, increased end use efficiency, increased use of coal resources and new clean coal generation. I think all those are very important. Clearly the efficiency options are the quickest that we can get and some of the supply options are the next quickest.

In terms of this hearing, the effect of environmental regulation as a factor in increasing gas prices I think is on the bottom end of that list. The only other comment is that in terms of allowing the construction of new coal plants, that environmental regulation needs to address four pollutants, including CO₂, for the industry to be able to take that action that they want to take.

Senator CARPER. I'm sorry, I didn't fully understand your last sentence. Just say the last sentence again.

Mr. BLUESTEIN. That there is a lot of interest in promoting new coal generation. What we are hearing from power companies is that they would like to do that, but they need some certainty on CO₂ regulation.

Senator CARPER. OK, good, thanks. Would you say that one more time?

[Laughter.]

Senator CARPER. All right, Mr. Smith, real quick, closing comments.

Mr. SMITH. We need to work on both supply as well as the demand side of the equation. I think supply has been addressed. Demand side, I think if we are trying to encourage new baseload generation, and more reliance on efficient generation, then I think we need to encourage, the environmental regime, whatever it is, needs to consider and count the attributes of that efficiency.

Senator CARPER. Good. My thanks to each of you. Thank you, Mr. Chairman.

Senator VOINOVICH. I would like to thank the witnesses for being here today. I look forward to hearing some recommendations from you. After the committee is adjourned, I would like to spend some time talking with you about some ideas I have on how you can get information to this committee.

Thank you very, very much for being here today.

[Whereupon, at 11:48 a.m., the subcommittee was adjourned.]

[Additional statements submitted for the record follow.]

STATEMENT OF HOWARD GRUENSPECHT, DEPUTY ADMINISTRATOR, ENERGY INFORMATION ADMINISTRATION, U.S. DEPARTMENT OF ENERGY

Mr. Chairman and Members of the Committee:

I appreciate the opportunity to appear before you today to discuss developments affecting natural gas use, particularly in the power sector. My testimony focuses on natural gas market changes that have occurred over the last 15 years and projections through 2030.

The Energy Information Administration (EIA) is an independent statistical and analytical agency within the Department of Energy. We are charged with providing objective, timely, and relevant data, analysis, and projections for the use of the Congress, the Administration, and the public. We do not take positions on policy issues, but we do produce data, analysis, and forecasts that are meant to assist policymakers in their energy policy deliberations. Because we have an element of statutory independence with respect to the analyses, our views are strictly those of EIA and should not be construed as representing those of the Department of Energy or the Administration.

Before turning to long-term projections, this testimony reviews historical data related to recent trends in natural gas prices and uses.

RECENT HISTORY, 1990–2005

Natural Gas Prices

Natural gas markets were significantly restructured during the 1980s through enactment of statutes such as the Natural Gas Policy Act of 1978 and the Natural Gas Wellhead Decontrol Act of 1989 and by Federal Energy Regulatory Commission orders designed to increase the competitiveness of natural gas markets through unbundling and the workout of pre-existing take-or-pay contracts.

In the aftermath of these actions, the average wellhead price fell considerably from the level of \$4.25 per thousand cubic feet (mcf) (Note: all prices are in 2004 dollars unless otherwise noted) reached in 1984. Between 1990 and 1999, wellhead prices averaged \$2.28 per mcf and remained below \$2.64 each year during this period. Natural gas consumers, particularly large electric sector and industrial users, also benefited from increasingly competitive natural gas transportation markets during this period, further reducing their delivered cost.

More recently, natural gas prices have climbed significantly. The average wellhead price in 2000 was \$3.98 per mcf, 75 percent higher than the average price during the 1990s, and wellhead prices averaged \$4.34 per mcf between 2000 and 2004. The average wellhead price in 2005 is estimated at \$7.26 per mcf, more than three times the average price during the 1990s.

Natural Gas Use by Sector

Natural gas consumption in the United States fell from 22.1 trillion cubic feet (tcf) in 1972 to 16.2 tcf in 1986. Between 1986 and 1997, consumption rose to 22.7 tcf. Since 1997, overall consumption has been relatively stable near this level.

Residential and commercial consumption of natural gas has also been relatively flat over the past decade (Figure 1). Over 60 million households in the United States are currently heated with natural gas, and natural gas continues to be the fuel of choice for about two-thirds of new single-family houses. Consumption in the residential and commercial sectors is driven largely by the seasonal demand for space heating.

Annual consumption of natural gas for electricity generation has increased from a range of 3.2 to 3.9 tcf during the early 1990s to an estimated range of 5.1 to 5.8 tcf from 2000 to 2005. Although the overall trend shows increasing use in this sector, consumption varies from year to year, driven largely by weather, electricity demand, and any disruption in alternative generation facilities.

Rising use of natural gas by electric generators over the past decade has been roughly offset by a decline of natural gas use in the industrial sector, which uses more natural gas than any other sector. Industrial consumption reached 9.7 tcf in 1997, a level second only to peak levels in the 1970s, and decreased to an estimated 7.8 tcf in 2005 as natural-gas-intensive manufacturing activities responded to recent natural gas price developments.

Natural Gas in Electricity Generation

An increase in natural gas generation does not necessarily imply a commensurate increase in natural gas consumption by electric generators if the efficiency of generation is also changing. The gap between the 118-percent increase in natural gas-fired generation (from 309 billion kilowatthours to an expected value of 673 billion kilowatthours) between 1990 and 2005 and the smaller 84 percent increase in natural gas used by electric generators over the same period implies that the average efficiency of all natural gas generation improved by roughly 16 percent.

The increase in the apparent efficiency of natural gas generation over the past 15 years largely reflects the recent introduction of increasingly efficient and reliable natural gas generating technologies, notably advanced combined-cycle units. Between 1999 and 2005, over 230 gigawatts of new generating capacity was added and nearly all of it was primarily natural-gas-fired (Figure 2). This rate of generating capacity expansion has not been seen since the 1970s. The availability of this technology, which allowed capacity to be added in modest increments close to major load centers with a relatively short construction time, along with attractive natural gas prices during the 1990s, the 1987 repeal of provisions in the Power Plant and Industrial Fuel Use Act that had previously prohibited the use of natural gas by new electric generating units, and Clean Air Act provisions favoring the use of inherently cleaner fuels all played some role in driving this outcome.

It is also worth noting that rapid growth in natural gas capacity does not necessarily imply a commensurate increase in natural gas generation if the new plants are not used very intensively. Under present natural gas market conditions, many of the new natural gas plants are not operating very intensively, and older, less efficient oil and natural gas plants are being retired. If all the natural gas plants added between 1990 and 2005 were running at just a 50 percent utilization rate (which would be substantially more than the actual experience) while the older natural gas plants continued to operate, the increase in natural gas generation would have been about 1,150 billion kilowatthours, more than three times the actual increase.

Over the same 1990 to 2005 period, amendments to the Clean Air Act have required the power industry to significantly reduce emissions. The Clean Air Act Amendments of 1990 (CAA90) called for reductions in the annual emissions of sulfur dioxide (SO₂) by electricity generators in the power sector. SO₂ emissions had to be reduced to approximately 12 million tons in 1996, 9.48 million tons per year from 2000 to 2009, and 8.95 million tons per year thereafter. The CAA90 also called for significant reductions in nitrogen oxide emissions (NO_x), setting boiler-type specific NO_x emissions standards for each plant.

Between 1990 and 2005 both SO₂ and NO_x emissions in the power sector fell significantly, with SO₂ emissions declining over 30 percent while NO_x emissions declined over 40 percent (Figure 3). These reductions were mostly achieved by adding

emissions control equipment or switching to lower sulfur subbituminous coal at many of the Nation's coal plants. However, reducing these emissions has not led to a reduction in coal generation. In fact, despite few new plants being added between 1990 and 2005, coal generation in the power sector increased from 1,572 billion kilowatthours to 2,001 billion kilowatthours, a 27 percent increase. While natural gas generation grew more in percentage terms, coal generation actually increased by a larger amount in absolute terms, 429 billion kilowatthours versus 364 billion kilowatthours over this period.

Cumulative retirements of coal-fired units between 1990 and 2004 were less than 2 percent of coal-fired capacity and were concentrated among smaller units. Generally speaking, it is less cost-effective to retrofit emissions controls on smaller coal-fired generating units than on larger ones. In this regard, smaller coal-fired generators faced choices similar to those facing industrial boilers that used coal or residual fuel oil, which often responded to emissions control requirements by switching to natural gas or curtailing their operations.

A major reason that so few coal plants were added during the 1990s is that most generating companies did not need large new baseload power plants that are designed to operate at high utilization rates regardless of seasonal and diurnal variations in total electricity demand. In 1990, the average capacity factor for power sector coal plants was only 59 percent, while the average for nuclear plants, another baseload technology, was only 66 percent. These relatively low rates of utilization left substantial room for increases in coal and nuclear generation without the need to add new capacity. With the growth in electricity demand that has occurred over the last 15 years, existing coal and nuclear plants are now being used more intensively, and power companies are starting to plan for new baseload capacity.

PROJECTIONS, 2005–2030

Near-Term Projections

Over the next few years, natural gas prices and consumption are likely to vary with weather and economic conditions. Currently natural gas prices remain high relative to historical prices, but they have declined in recent weeks because of a warmer-than-normal winter in most parts of the country to date. EIA's February 2006 Short-Term Energy Outlook (STEO) projects that the wellhead price will average roughly \$7.90 per mcf in both 2006 and 2007 (nominal dollars). These prices reflect both limited supplies as well as the projected prices for competing fuels. Overall, domestic dry natural gas production in 2005 is estimated to have declined by 2.7 percent, mostly because of hurricane-related disruptions in production in the Gulf of Mexico. As the recovery from the hurricanes continues, dry gas production is projected to increase by 3.0 percent in 2006 and by 1.3 percent in 2007. On January 27, working gas in storage stood at an estimated 2,406 billion cubic feet (bcf), which is the highest stock level for this time of year since 1989. Natural gas stocks are 296 bcf above 1-year ago and 529 bcf above the 5-year average.

Summer weather in 2006 is expected to be cooler than the summer of 2005, which was one of the hottest on record. As a result, demand for natural gas for production of electricity is expected to fall in 2006 and then increase in 2007.

Long-Term Projections

The long-term projections discussed here are drawn from the reference case of the Annual Energy Outlook 2006 (AEO2006), which was released in December 2005. The AEO2006 is based on Federal and State laws and regulations in effect on October 1, 2005, including those sections of the Energy Policy Act of 2005 that establish specific tax credits, incentives, or standards. However, the potential impacts of pending or proposed legislation, regulations, and standards—or of sections of legislation that have been enacted but that require funds or implementing regulations that have not been provided or specified—are not reflected in the projections. The AEO2006 also includes the provisions of the Clean Air Interstate Rule (CAIR) and the Clean Air Mercury Rule (CAMR), issued by the U.S. Environmental Protection Agency (EPA) in March 2005. These rules are expected to result in large reductions of emissions from power plants.

The AEO2006 is not meant to be an exact prediction of the future but represents what might happen, given technological and demographic trends, current laws and regulations, and consumer behavior as derived from known data. EIA recognizes that projections of energy markets are highly uncertain and subject to many random events that cannot be foreseen, such as political disruptions and technological breakthroughs. In addition to these phenomena, long-term trends in technology development, demographics, economic growth, and energy resources may evolve along a dif-

ferent path than expected in the projections. The AEO2006 includes many alternative cases intended to examine the implications of such uncertainties.

Natural Gas Prices

In the AEO2006 reference case, average wellhead prices for natural gas in the United States decline from \$5.49 per mcf (2004 dollars) in 2004 to \$4.46 per mcf in 2016 as the availability of new import sources and increased drilling expand available supply (Figure 4). After 2016, wellhead prices are projected to increase gradually, reaching \$5.92 per mcf in 2030. Growth in liquefied natural gas (LNG) imports, Alaskan production, and lower-48 production from unconventional sources is not expected to be large enough to completely offset the impacts of resource depletion and increased demand in the lower-48 States (Figure 5).

Natural Gas Supply

Domestic dry natural gas production is projected to increase from 18.5 tcf in 2004 to 21.6 tcf in 2019, before declining to 20.8 tcf in 2030 in the AEO2006 reference case. Net pipeline imports of natural gas, are expected to decline from 2004 levels of 2.8 tcf to about 1.2 tcf by 2030 due to resource depletion and growing domestic demand in Canada.

To meet a projected demand increase of 4.5 tcf from 2004 to 2030 and to offset an estimated 1.6-tcf reduction in net pipeline imports, the United States is expected to depend increasingly on imports of LNG. Net LNG imports in the AEO2006 reference case are projected to increase from 0.6 tcf in 2004 to 4.4 tcf in 2030. Besides expansion of three of the four existing onshore U.S. LNG terminals (Cove Point, Maryland; Elba Island, Georgia; and Lake Charles, Louisiana) and the completion of two U.S. terminals currently under construction, new facilities serving the Gulf Coast, Southern California, and New England are added in the reference case.

Natural Gas Consumption

The total demand for natural gas is projected to increase at an average annual rate of 1.2 percent from 2004 to 2020, then to remain relatively stable through 2030. The demand for natural gas in the residential, commercial, and industrial sectors is projected to increase steadily, but at a rate well under 1 percent per year from 2004 to 2030. The projected leveling off in total natural gas consumption after 2020 is driven by changes in the mix of fuels used to generate electricity, as natural gas is expected to lose market share to coal in the electric power sector during the latter half of the projection period. Natural gas consumption in the electric power sector is projected to grow at the relatively rapid rate of 1.2 percent per year between 2004 and 2019, before it begins to decline. Between 2019 and 2030, natural gas consumption in the power sector is expected to decline by 15 percent. Over the entire 2004 to 2030 period, natural gas consumption in the power sector increases from 5.3 tcf to 6.4 tcf.

Electric Power Sector Generation and Capacity Additions

The demand for electricity is expected to grow at an average rate of 1.6 percent per year through 2030. To meet this growth, the power sector will increase its use of coal, natural gas, renewable fuels, and nuclear power (Figure 6). In the mid-term, over the next 10 years, both natural gas and coal generation increase as existing plants are used more intensively. Renewable generation also grows as new plants stimulated by the tax credit extension in EPACT2005 are added. For example, between 2004 and 2015, coal generation in the power sector is projected to increase from 1,954 billion kilowatthours to 2,239 billion kilowatthours, while natural gas generation grows from approximately 619 billion kilowatthours to 902 billion kilowatthours, and renewable generation grows from 323 billion kilowatthours to 448 billion kilowatthours.

After 2010, capacity additions are expected to be increasingly dominated by new coal power plants and coal generation grows significantly (Figure 2). For example, through 2005 natural gas plants accounted for over 90 percent of the capacity added in the expansion that began in 1999. However from 2010 on new coal plants are expected to account for 57 percent of total capacity additions, while natural gas technologies account for 36 percent, renewable plants account for 5 percent, and nuclear plants accounts for the remainder. Even with higher fuel prices, natural gas plants, because of their lower construction costs, are generally the most economical choice for plants that are needed to operate less intensively. Over the entire 2005 to 2030 time period, 174 gigawatts of new coal capacity, including 19 gigawatts of coal-to-liquids plants in the industrial sector, are added to make liquid fuels and electricity.

Clean Air Interstate Rule and Clean Air Mercury Rule

Our projections show that increases in coal-fired generation are expected to occur despite significant reductions in sulfur dioxide (SO₂), nitrogen oxide (NO_x), and mercury emissions that are required because of recently promulgated regulations. The EPA issued the CAIR in March 2005. CAIR caps emissions of SO₂ for the District of Columbia and 28 states in the East and Midwest. CAIR is scheduled to supersede Title IV of the Clean Air Act through the use of a cap-and-trade approach. Phase I of CAIR comes into effect in 2010 for SO₂ and Phase II enters into effect in 2015. CAIR will also regulate NO_x emissions. Each affected State will be subject to two NO_x limits under CAIR: a 5-month summer season limit and an annual limit. These caps are expected to stimulate additions of emission control equipment to some existing plants.

In March 2005, EPA also issued the CAMR, which establishes a cap-and-trade approach to reduce mercury emissions from coal-fired power plants in the United States. In addition to nationwide caps, each new and existing coal-fired power plant must meet mercury emissions standards based on its coal type. Mercury has to be reduced in two phases: the national Phase I mercury cap is 38 short tons in 2010 and the Phase II cap is 15 short tons by 2018, though emissions banking is allowed. Several States have also adopted or are considering mercury control regulations for power plants within their jurisdictions.

In order to meet CAIR and other State requirements, power companies are projected to add flue gas desulfurization equipment to 141 gigawatts of capacity. Because of these actions and the growing use of lower-sulfur coal, SO₂ emissions are projected to drop from 10.9 million short tons in 2004 to 3.7 million short tons in 2030, a 66-percent decline (Figure 3). National NO_x emissions are projected to decrease from 3.7 million short tons in 2004 to 2.2 million short tons in 2030, a decline of 41 percent. The primary compliance option for reducing NO_x will be the addition of selective catalytic reduction equipment to 118 gigawatts of generating capacity. To comply with CAMR, power companies are expected to reduce their mercury emissions from over 50 tons in 2004 to 15 tons by 2030, a decline of more than 70 percent. Power companies are expected to retrofit about 125 gigawatts of capacity with activated carbon injection technology in order to comply with CAMR.

Although EIA does not anticipate that the emissions limits in CAIR and CAMR will lead to significant fuel switching away from coal, other types of emissions regulations could have such an effect. For example, several recent EIA analyses have found that stringent greenhouse gas limits could result in a major shift from coal to other fuels for electricity generation.

CONCLUSIONS

There are major uncertainties with any projection that looks out even a few years. For longer term projections like those in the AEO2006, key uncertainties include the rate of technological change, the rate of economic growth, unforeseen policy changes, and changes in consumer preferences. The AEO2006 includes numerous cases to examine many of these uncertainties. These include alternative economic growth cases, alternative fuel price cases, and many alternative technology cases. Generally, the only cases showing much greater use of natural gas in the power sector were those with much lower natural gas prices than are projected in the reference case.

This completes my testimony, Mr. Chairman. I would be glad to answer any questions you and the other members may have.

**Figure 1. Natural Gas Consumption by Sector
(trillion cubic feet)**

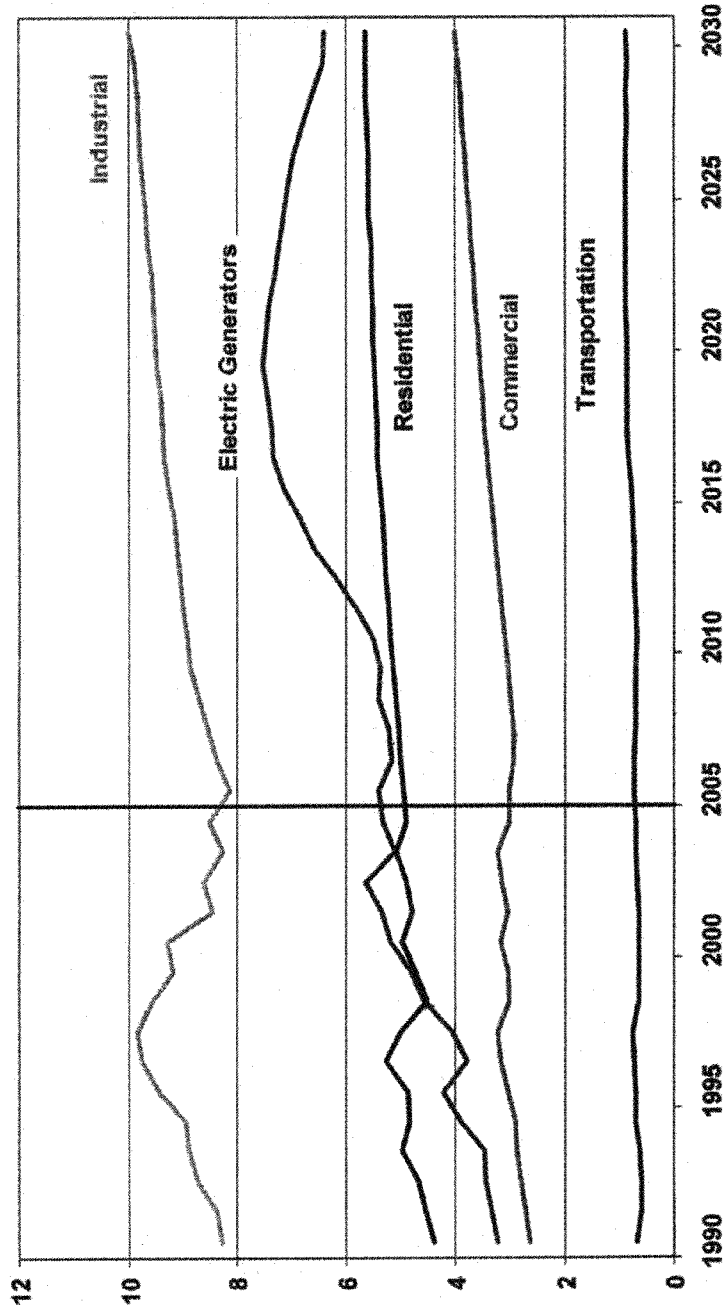
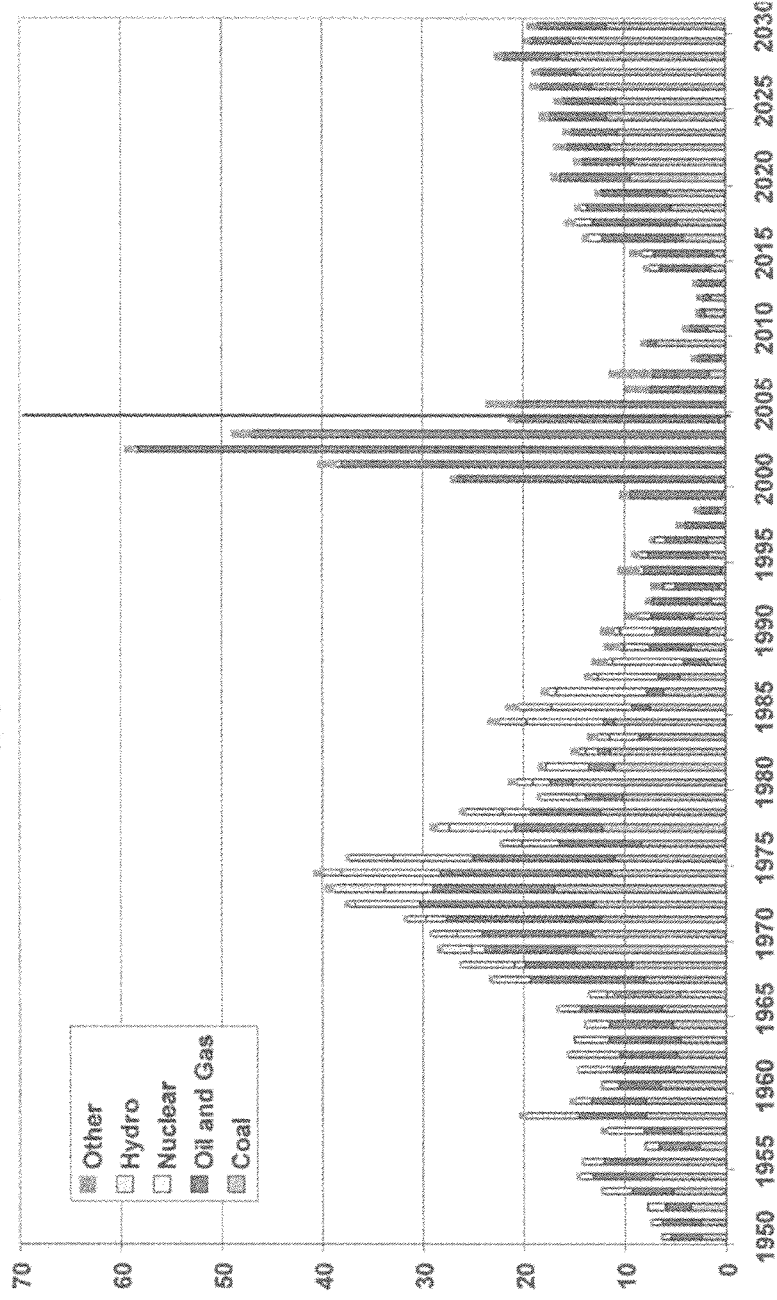


Figure 2. Capacity Additions by Year and Fuel
(gigawatts)



**Figure 3. Power Sector Emissions
(million tons)**

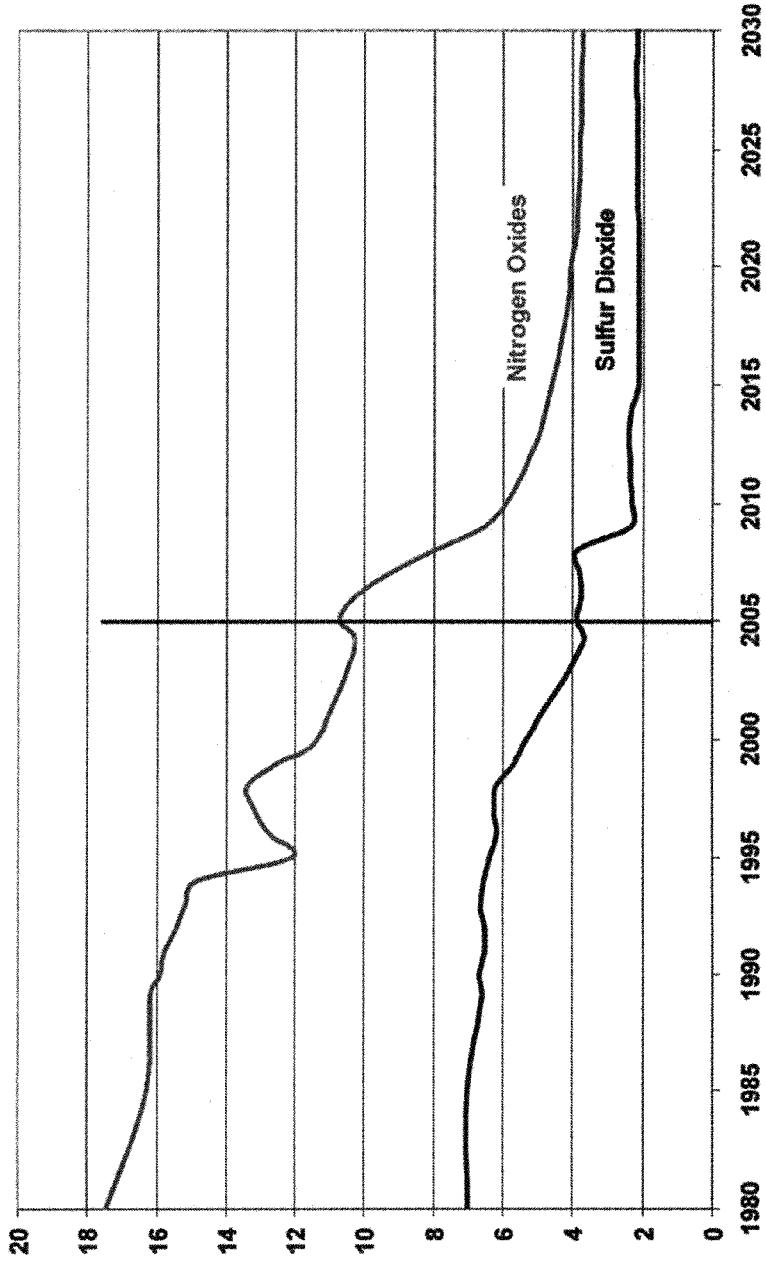


Figure 4. Natural Gas Wellhead Prices

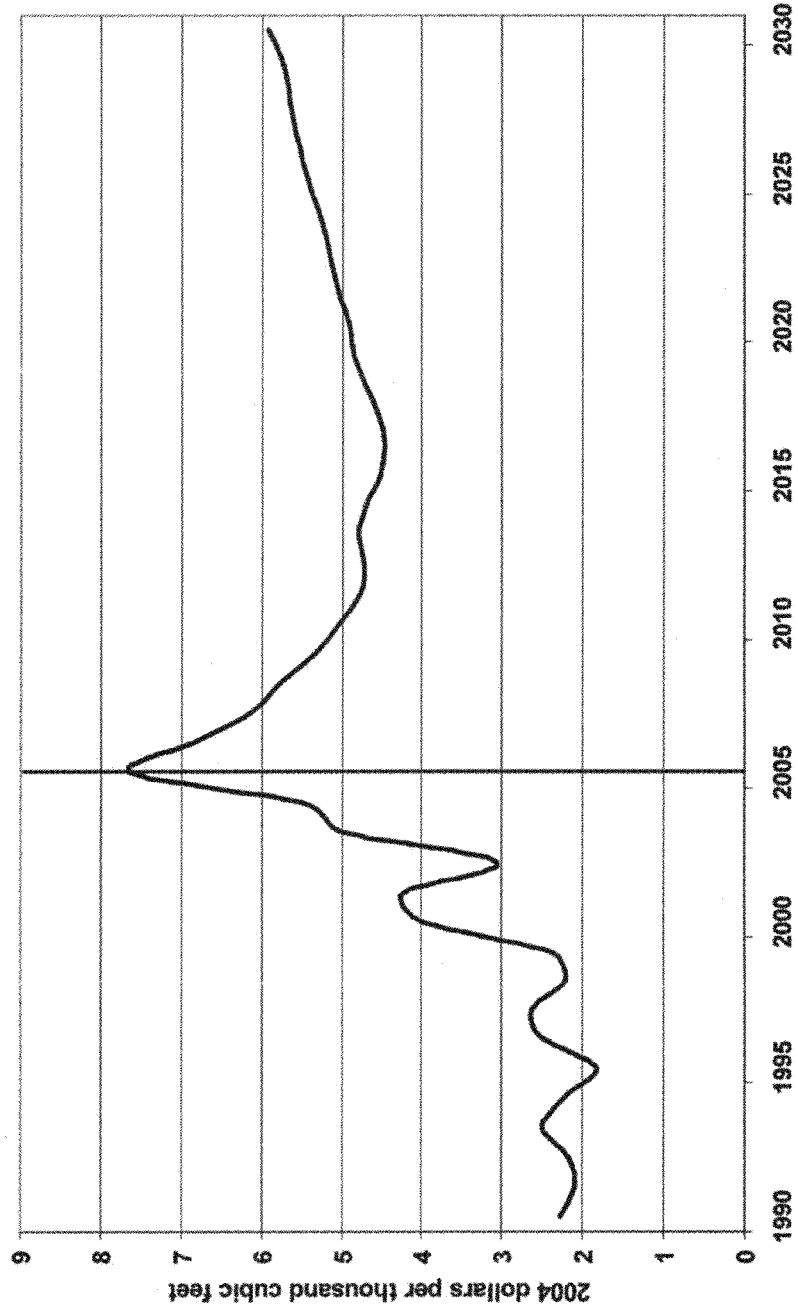


Figure 5. Natural Gas Supply
(trillion cubic feet)

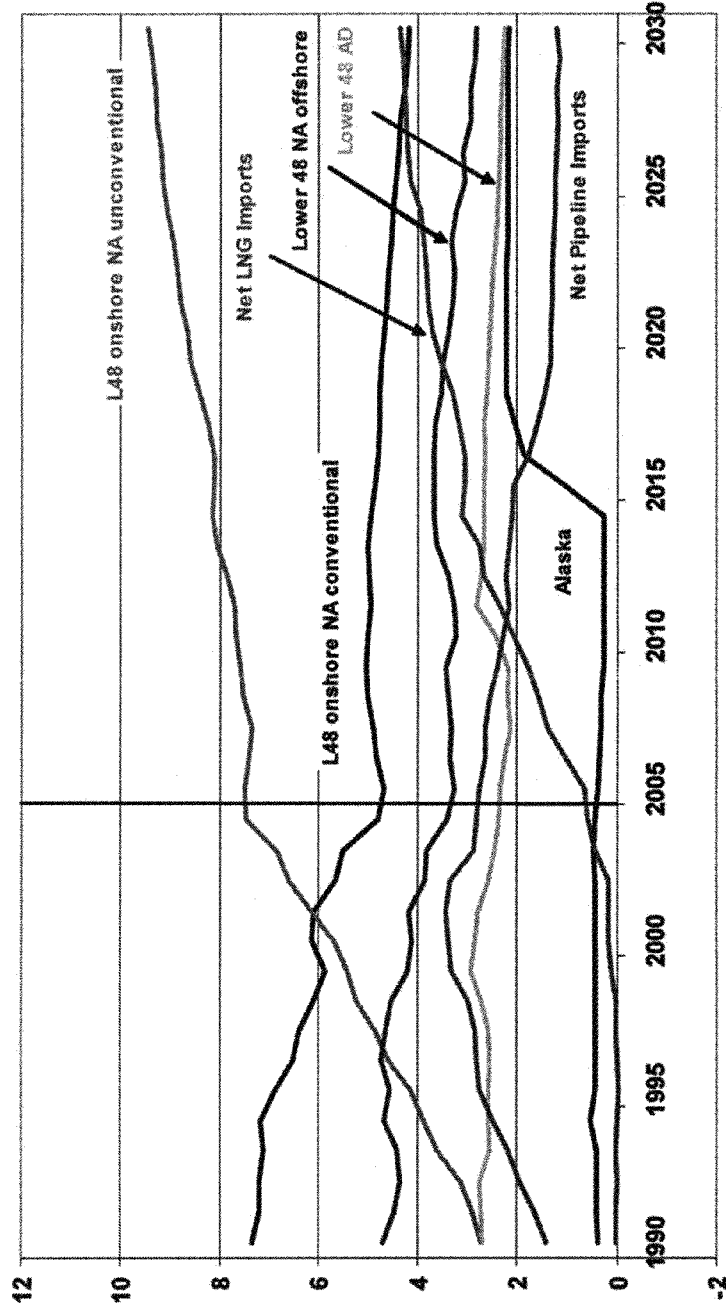
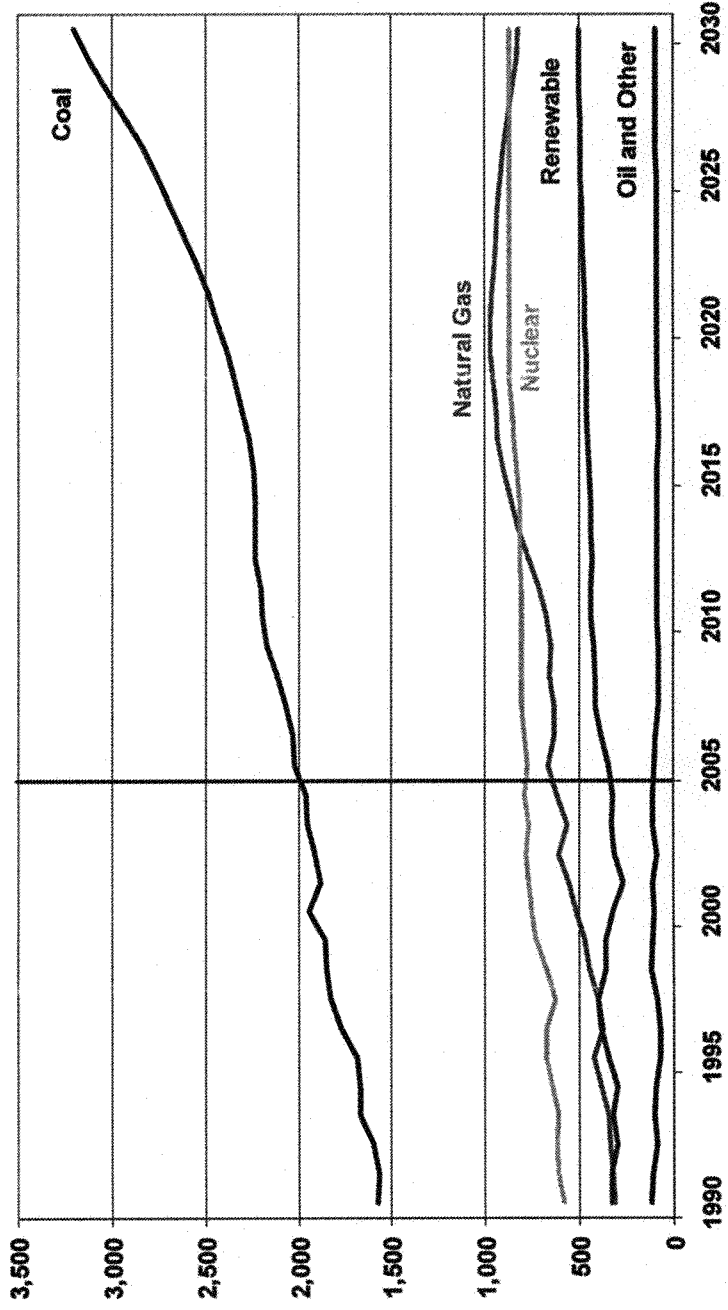


Figure 6. Power Sector Generation by Fuel
(billion kilowatthours)



RESPONSES BY HOWARD GRUENSPECHT TO ADDITIONAL QUESTIONS FROM
SENATOR LIEBERMAN

Question 1. Please state in absolute terms the extent to which coal-fired power plant capacity was increased after November 15, 1990. Please state in absolute terms to the extent to which natural gas-fired power plant capacity was increased after November 15, 1990.

Response. EIA data on generating capacity records the commercial operating date by month and year. During the period December 1990 through 2004, 13,010 megawatts (net summer capacity) of coal-fired generating capacity entered commercial service. Note that most of this capacity entered service in the first half of the period. By 1993, 7088 megawatts (54 percent) had entered service, and by 1996, 11,330 megawatts (87 percent) had entered service. Because of the long lead—times required to develop coal-fired generating capacity, it is likely that most of this capacity was under construction or in the advanced planning stages prior to November 15, 1990.

During the same December 1990 through 2004 period, 227,130 megawatts of gas-fired generating capacity entered commercial service. In contrast to the coal capacity additions, the additions of gas-fired capacity are concentrated in the latter part of the period. During 2000 through 2004, 183,486 megawatts of gas-fired capacity (81 percent of the total) entered service. In 2002 and 2003 alone, 101,772 megawatts of capacity (45 percent of the total) entered service.

Question 2. Please assess the impact of the following factors on natural gas demand since 1990: the cost of natural gas, capital costs for new natural gas plants, opportunities for siting such plants, the time required to build such plants, and responsiveness to load changes of gas-fired power plants. Please compare or contrast the effect of the requirements of the Clean Air Act and EPA's implementation thereof to or with the factors enumerated in the previous sentence in terms of their impact on natural gas demand.

Response. Cost of Natural Gas: Generally through the 1990's and into the early part of this decade the price of natural gas was, compared to current prices, moderate. Between 1990 and 2002, the average annual wellhead price of natural gas ranged from a low of \$1.55 per thousand cubic feet to a high of \$4 per thousand cubic feet. In 2002 the average annual price was \$2.95 per thousand cubic feet. In contrast, the annual average for 2005 through November is estimated by EIA at \$7.28 per thousand cubic feet. Since the price of fuel is a major cost factor for generating plants, moderate gas prices were important in encouraging the development of gas-fired plants.

Capital Costs for New Natural Gas Plants.—Natural gas plants have significantly lower capital costs than coal-fired plants. EIA estimates that a new coal plant costs two to three times as much per megawatt of capacity as a new gas plant. This lower capital cost was a major attraction of gas-fired capacity to the independent power developers who built most of the new gas-fired capacity. Since these independent power producers did not have guaranteed markets or regulated returns on investment, they preferred relatively low-cost investments that reduced the amount of capital at risk.

Opportunities For Siting Such Plants.—Compared to coal plants, gas-fired plants require less land and have fewer potential environmental impacts, and are therefore easier to site.

Time Required To Build Such Plants.—EIA estimates that the lead-time for installing a new gas-fired plant is about two to 3 years, compared to 4 years for a coal plant. The shorter lead-time was attractive to developers, as it allowed them to more quickly turn their capital investment into a revenue-producing asset.

Responsiveness to Load Changes of Gas-Fired Power Plants.—Gas-fired combustion turbine plants (in essence, ground-mounted jet engines) have a unique ability to quickly respond to changes in load. Combustion turbines can go from shut-down to full load to shut down again in a matter of minutes. In contrast, a coal plant takes hours to go from cold shutdown to full load, and coal plants are not designed for frequent startups and shut-downs. This makes gas-fired turbines ideal for meeting brief daily peak loads. Of the 227,130 megawatts of gas-fired capacity built during the period December 1990 through 2004, 83,348 megawatts (37 percent) are combustion turbines. (Most of the balance is combined cycle capacity, a more complex technology that also makes use of combustion turbines but does not have the same load-following flexibility.)

Compare Or Contrast The Effect Of The Requirements Of The Clean Air Act And EPA's Implementation With The Factors Discussed Above.—We have not performed the analysis necessary to assess the relative importance of the Clean Air Act and its amendments and the other factors discussed here in encouraging the develop-

ment of gas-fired generation since 1990. Such an analysis would be complex due to the many factors at work and their interplay. It does seem clear that the Clean Air Act increased the cost of building and operating new coal plants, and to that extent encouraged the use of other fuels. However, as noted above, other factors also encouraged developers to turn to gas-fired plants and these factors likely would have been influential even in the absence of the Clean Air Act and its amendments.

Question 3. Throughout the 1990's a number of States, as well as the Federal Energy Regulatory Commission, restructured electricity ratemaking or deregulated it. Please describe the impact of electricity restructuring or deregulation on the building of new natural gas power plants and the demand for natural gas.

Response. Federal and State Government actions encouraged or (at the State level) even mandated the sale of existing generating capacity to independent power producers. These policies also encouraged the development of new generating capacity by independent power producers. During the same period, State and Federal environmental regulation made the construction and operation of new coal-fired units more costly than in the past.

As also noted in the response to Question 2, independent power producers operated in relatively open markets without the security of cost-based rates for their power sales, guaranteed sales areas, or regulated return on investment. In this deregulated environment, they sought to limit the financial and technical risks involved in building new generating capacity. Even regulated utilities were often risk-averse, due to a history of State regulators imposing financial penalties for nuclear and coal projects that critics claimed were excessively costly or unnecessary.

This regulatory environment encouraged power project developers, and particularly independent power producers, to seek lower-cost and lower-risk generating options. Gas-fired plants were most often the choice. Compared to coal-fired plants, gas-fired plants generally have lower capital costs, can be built more quickly, can be more easily sited (due to smaller space requirement and fewer environmental impacts), and have fewer environmental risks.

With respect to natural gas demand, we have not analyzed the relative importance of regulatory policy in encouraging the development of new gas-fired plants compared to other factors. As noted in the answer to Question 2, such an analysis would be complex due to the many factors at work and their interactions. Nonetheless, there is no question that the growth in electric power sector demand between 1990 and 2004 contributed significantly to overall growth in demand for natural gas.

RESPONSES BY HOWARD GRUENSPECHT TO ADDITIONAL QUESTIONS FROM
SENATOR VOINOVICH

Question 1. As discussed at the hearing, please provide a detailed accounting of your assumptions that lead you to predict that natural gas prices are at their peak now and will fall over the next 10 years. Please also provide any sensitivity analyses that EIA has completed to show what happens to natural gas prices if these assumptions are wrong.

Response. The projected decline in natural gas prices through 2016 reflects a growing abundance of gas supply relative to slower projected growth in gas consumption. The rise in domestic natural gas prices after September 1, 2005, reflected a short-term supply disruption caused by the temporary loss of gas (and oil) production capacity in the Gulf of Mexico region due to hurricane damage, the expectation of normal winter weather, and relatively tight natural gas markets. Henry Hub natural gas prices have fallen by more than 50 percent since their high in December 2005. On the demand side, high gas prices are projected to slow the construction and use of gas-fired electricity generation and growth in residential, commercial, and industrial gas consumption.

Over the next 10 years, the development of new liquefied natural gas (LNG) terminals and the expansion of existing LNG terminals are projected to augment domestic natural gas supply. The Annual Energy Outlook 2006 (AEO2006) reference case assumes that two new LNG terminals currently under construction will be completed before 2010. These LNG terminals are the Cheniere Energy, Inc. terminals in Freeport, Texas (1.5 billion cubic feet per day) and Cameron Parish, Louisiana (2.6 billion cubic feet per day), which are scheduled for completion in 2008 and 2009, respectively. The AEO2006 reference case also assumes that expansions of existing terminals that have been approved and proposed as of September 1, 2005, will proceed as planned. This includes the proposed expansion of 0.8 billion cubic feet per day at Cove Point, Maryland, and approved expansions of 1.1 billion cubic feet per day at Lake Charles, Louisiana, and 0.54 billion cubic feet per day at Elba Island, Georgia.

Projected incremental lower-48 gas production through 2015 comes primarily from unconventional gas resources (i.e., tight sands, gas shales, and coalbed methane), which are increasingly economic due to the projected improvement of well drilling, well completion, and formation fracturing technologies, along with favorable well-head gas prices. Technically recoverable unconventional resources of 458.8 trillion cubic feet are assumed in the AEO2006 reference case (300.3 trillion cubic feet of tight gas, 83.3 trillion cubic feet of shale gas, and 75.2 trillion cubic feet of coalbed methane). Rates of technological progress are also key assumptions in the AEO2006. The major technology assumptions underlying unconventional gas exploration and development are presented in Table 1.

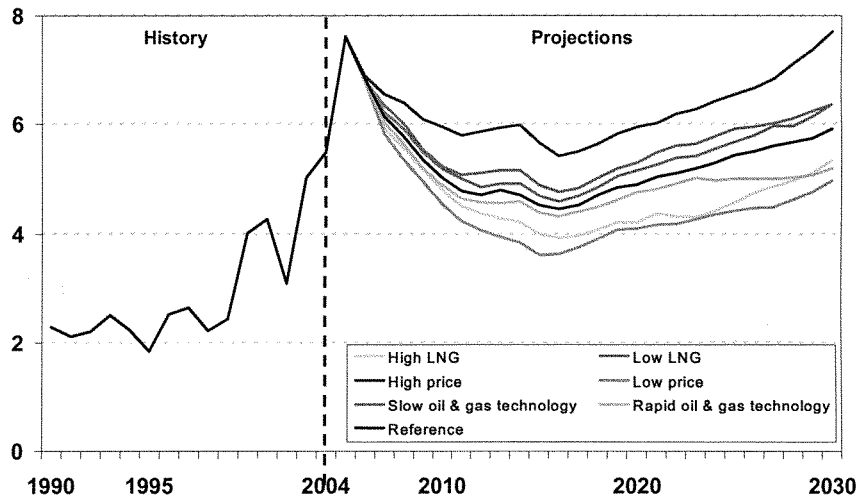
Table 1. Assumed Rates of Technological Progress for Unconventional Gas Recovery

Technology Type	Item	Type of Deposit	Rate
Advanced exploration & natural fracture detection.	Increases success rate	All types	0.2 percent/year
Geology technology modeling and matching	Improves EUR per well	All types	0.25 percent/year
More effective, lower damage well completion & stimulation technology.	Improves EUR per well	All types	0.25 percent/year
Advanced well completion technologies	Improves EUR per well	Tight Sands	10 percent by 2016
		Gas Shales	20 percent by 2016
Mitigation of environmental constraints	Increases proportion of areas currently restricted that become available for development.	All types	1 percent/year

EUR: Estimated Ultimate Recovery

In addition to the AEO2006 reference case, 31 cases were developed to reflect the uncertainty surrounding the reference case assumptions. The cases that show the most variation in the lower-48 natural gas wellhead price are shown in Figure 1. A description of these cases can be found in Appendix E of the AEO2006 (<http://www.eia.doe.gov/oiaf/aeo/pdf/appendixes.pdf>). The natural gas prices in all of the AEO2006 cases reflect the balance between supply and demand.

Figure 1. Lower 48 Natural Gas Wellhead Prices, 1990-2030 (2004 dollars per thousand cubic feet)



There are many factors that influence natural gas prices within the context of the Annual Energy Outlook. Among the more important factors that impact oil and gas supply and demand projections are: the assumed world oil price path, world oil and gas resources, economic growth, as well as fuel technology assumptions. This infor-

mation is contained in the AEO2006, which can be found at <http://www.eia.doe.gov/oiaf/aeo/index.html>.

Question 2. As discussed at the hearing, please provide an analysis that compares your projections for the next 10 years for natural gas prices and natural gas use by sector compared to what you projected for the previous 10 years.

Response. In the Annual Energy Outlook, natural gas prices and consumption are determined through the interaction of energy supply and demand among all fuels and in all sectors. The model used to make the projections contained in the AEO, the National Energy Modeling System (NEMS), is updated annually based on currently available data, the passage of new laws or regulations effecting energy markets, normal weather conditions, current trends in technological progress, current consumer behavior, and improvements in modeling approaches.

Exhibits 1–5, below, illustrate how EIA’s midterm natural gas wellhead prices and delivered prices by sector have changed.

The key elements which determine domestic natural gas supplies in NEMS include: conventional lower-48 finding rates; estimated ultimate recovery for unconventional gas plays; drilling, lease equipment and operating costs; conventional and unconventional drilling levels; lower-48 offshore supply; Canadian natural gas supply; and liquefied natural gas (LNG) imports. These elements are re-evaluated annually as new data become available.

Over the last few years, projections for two key sources, onshore lower-48 conventional production and pipeline imports from Canada, have changed dramatically as new data has shown smaller field discoveries and higher production decline rates than previously anticipated.

Considerable uncertainty still remains with regard to the supply, costs, and distribution of the remaining resources and the potential rate of technological progress that affects both the size of the recoverable resources and the costs of recovery. The progression of EIA changes to its domestic oil and natural gas models has led to the use of more data and ultimately better informed projections of future delivered natural gas prices and lower projected future gas consumption over time (see Exhibits 6–9).

Since 1996, EIA has produced annual evaluations of the accuracy of the Annual Energy Outlook (AEO). The forecast evaluation examines the accuracy of AEO forecasts dating back to AEO82 by calculating the average absolute percent errors for several of the major variables for AEO82 through AEO2004. The latest evaluation can be found at <http://www.eia.doe.gov/oiaf/analysispaper/forecast—eval.html>.

Question 3. You stated that “very small shifts in either demand or supply can [sic] have a big impact on price.” You also stated that natural gas demand by electric power providers and residential users is not very price responsive but “the industrial sector is one of the really few remaining places where demand is responsive to price.” Please explain the impact on home heating and electricity prices and employment in the industrial sector if a policy creates a shift in the demand or supply of natural gas.

Response. In the tight natural gas market situation we are in today, relatively small changes in either the supply or demand situation can have a large impact on natural gas prices. For example, in recent months, warmer-than-normal weather conditions have led to lower than expected natural gas use for home heating. This has had a dramatic impact, with natural gas spot prices at the Henry Hub falling from over \$15 per million Btu in December to under \$7 today. What impact a particular policy might have would depend on the specifics of the policy and the market conditions that exist when it takes affect. However, over time, the existing tight market situation should improve as high natural gas prices stimulate the development of new supplies and provide consumers an incentive to reduce their energy use.

High natural gas prices do have an impact in all sectors of the economy. In the residential sector, natural gas accounts for 65 percent of heating energy use and 68 percent of water heating energy use. In electricity markets, natural gas is becoming an increasingly important fuel. Between 1999 and 2005, nearly 95 percent of all new power plants added were fueled by natural gas and the share of generation from natural gas grew from 15 percent to 18 percent. High natural gas prices also contribute to high electricity prices because natural gas-fired plants frequently set electricity prices in competitive power markets.

The impacts of high natural gas prices vary from industry to industry. A report to Congress, Impact of Rising Natural Gas Prices on the U.S. Economy and Industries, released by the Department of Commerce in July of 2005 (<https://www.esa.doc.gov/ngfr.cfm>), found that there is no clear evidence, except for nitrogenous fertilizer manufacturing, that higher natural gas prices were the primary rea-

son for the poor economic performance of natural-gas-intensive industries during 2000 to 2004. Higher natural gas prices were certainly an additional burden on these industries, but their performance was already deteriorating prior to the onset of higher prices. For the nitrogenous fertilizer industry, as much as 13 percent of the annual level of employment from 2000 and 2004 was lost due to higher natural gas prices. For the remaining four industries studied in detail, including petrochemicals, all other basic organic chemicals, plastics, and iron and steel, the Department of Commerce study found that only 4 percent or less of the jobs from 2000 and 2004 were lost due to the rise in natural gas prices.

RESPONSES BY HOWARD GRUENSPECHT TO ADDITIONAL QUESTIONS FROM
SENATOR JEFFORDS

Question 1. What was the natural gas share of total electric generation in the United States in 1970 (pre-environmental regulation) compared to today?

Response. In 1970, natural gas accounted for 24.3 percent of total net electricity generation (372.9 billion kilowatt-hours out of a total of 1535.1 billion kilowatt-hours). In 2005, preliminary full year data show that natural gas accounted for 18.6 percent of the total (751.3 billion kilowatt-hours out of a total of 4037.4 billion kilowatt-hours).

Question 2. We heard that the United States has the highest natural gas prices in the world, but we've also heard a lot about high gas prices in Europe recently. What are the current prices of natural gas and LNG in Western Europe? Historically, how have prices in the United States and Western Europe compared?

Response. According to International Energy Agency data, which are also posted on the Energy Information Administration's (EIA) Web site at (<http://www.eia.doe.gov/emeu/international/gasprice.html>), 2004 industrial natural gas prices were the highest in Switzerland at \$8.90 per million Btu and the lowest in Finland at \$4.30 per million Btu (the most recent comparative date available). These rankings are based on 10 Western European countries for which data exist and on U.S. data, although not all countries have data for each year. In 2004, U.S. natural gas prices for households were ranked 4th at \$6.20 per million Btu (out of 7 countries). The rankings have varied since 1998, although Switzerland is the highest in every year. The United States ranked 9th (out of 10 countries) in 1998; 4th (out of 9 countries) in 2000; 6th (out of 8 countries) in 2002.

RESPONSES BY WILLIAM WEHRUM TO ADDITIONAL QUESTIONS FROM
SENATOR JEFFORDS

Question 1. What was the natural gas share of total electric generation in the United States in 1970 (pre-environmental regulation) compared to today?

Response. We have coordinated our response to this question with DOE, and therefore defer to the response submitted by Mr. Gruenspecht.

Question 2. We heard that the United States has the highest natural gas prices in the world, but we've also heard a lot about high gas prices in Europe recently. What are the current prices of natural gas and LNG in Western Europe? Historically, how have prices in the United States and Western Europe compared?

Response. We have coordinated our response to this question with DOE, and therefore defer to the response submitted by Mr. Gruenspecht.

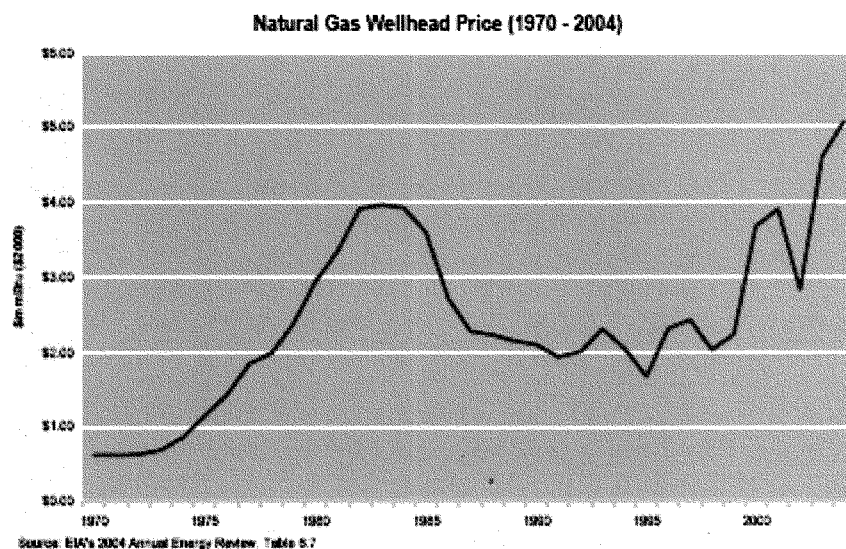
Question 3. In designing programs meant to achieve the Nation's air quality goals, what is EPA's objective with regard to the impact on energy prices and economic growth? Does the Agency take these factors into account and work with the Department of Energy and the Energy Information Agency to minimize such impacts?

Response. In the beginning of this Administration, the President issued the National Energy Plan (NEP). In the NEP, EPA was directed, among other things, to review New Source Review (NSR) regulations with regard to their impact on investment in new electric generation and refinery capacity, efficiency and environmental protection. EPA was also directed to propose legislation that would establish a flexible, market-based program to significantly reduce and cap emissions of sulfur dioxide, nitrogen oxides, and mercury from electric power generators. EPA designed Clear Skies legislation and the related rulemakings—the Clean Air Interstate Rule and the Clean Air Mercury Rule our New Source Review regulations and the Clean Air Visibility Rules—to be part of the solution. Our guiding principle in the design of these programs was to achieve national air quality goals without compromising economic growth and energy security. In putting forth these initiatives, we worked

closely with our colleagues at the Department of Energy (DOE) and the Energy Information Administration (EIA).

Question 4. Since passage of the Clean Air Act in 1990, how much has natural gas use increased in the United States? What is the status of natural gas demand over the last decade? What factors have resulted in increased use of natural gas in the power sector?

Response. Natural gas use in the United States has increased about 6 percent overall since the passage of the Clean Air Act of 1970.¹ Over the last decade (from 1995 to 2004), total demand has been relatively flat. However, the mix of natural gas use and its increased use for electric power generation has changed. The significant increase in the use of natural gas in the power sector that occurred over the last decade resulted primarily due to two factors. First, real natural gas prices substantially declined over that period (see Figure below) and second, the power industry could procure and install natural gas combined cycle electric generation in relatively shorter time periods than similarly sized coal plants. Moreover, natural gas combined cycle plants are nearly twice as efficient as natural gas steam units, while also being much cleaner from an air emissions standpoint. The repeal of sections of the Power plant and Industrial Fuel Use Act (FUA, 1978) in 1987, further contributed to the increased use of natural gas in the power sector. As a result, natural gas and oil could again be used to fuel large new baseload electric power plants and restrictions on gas- and oil-burning industrial boilers, turbines, and engines were lifted.



Question 5. Please provide a comparison and analysis of the cost of new coal fired electricity generation and new combined cycle natural gas units during the mid 1990's. As part of your analysis, please compare new units with and without Best Available Control Technology requirements in terms of cents per kilowatt hour. Please indicate the extent to which such costs are capital costs, fuel costs, and fixed or variable operating and maintenance costs.

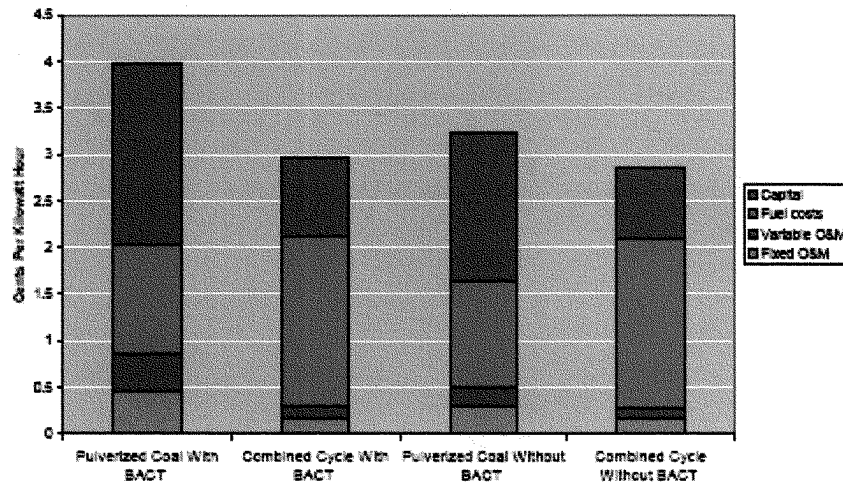
Response. The figure, below, is a cost comparison of new coal-fired generation and new combined cycle natural gas units during the mid 1990's. It shows new units with and without Best Available Control Technology (BACT) requirements. As shown, new coal-fired plants with BACT controls are significantly more expensive than combined cycle gas-fired power plants either with or without BACT. This economic situation generally led to the building of new combined cycle base load units to handle additional electricity demand (in areas where there was no excess capacity of existing coal-fired generation) rather than new coal-fired generation, because such units were predicted to be more economical to operate, and had many other attrac-

¹(Derived from Energy Information Administration, Annual Energy Review, August 2005.)

tive features. In 1999, the National Petroleum Council summarized the advantages of natural gas combined cycle:

“ . . . Notwithstanding volatility, five circumstances have led to the choice of natural gas as the preferred fuel for new generating stations. One, the heat rate on combined-cycle gas generation plants gives a strong economic advantage. Two, the capital cost of a combined-cycle gas-fired plant is approximately \$500 to \$650 per megawatt, compared to \$1,000 to \$1,500 per megawatt for coal-fired plants. Three, the construction time for the combined-cycle plants is approximately 2 years versus 5 to 7 years for coal-fired plants. Four, in a deregulated environment, electricity generators seek the short possible time between the decision to build and point at which capital costs are recovered. Gas-fired plants have the shortest construction time. Five, it is far easier to obtain permits for new combined-cycle gas plants than for coal-fired plants.”²

Comparative Costs of New Pulverized Coal and Combined-Cycle



Note: The costs for new plants and fuels are based on various reports issued by Department of Energy and Energy Information Administration. The plant costs have been adjusted for the plant size and the year of operation, using the GDP implicit price deflator reported by Department of Commerce. The delivered cost for natural gas in this analysis is \$2.70/MMBTU and the delivered cost for coal is \$1.26/MMBTU. The costs of environmental controls are based on EPA's Integrated Planning Model.

Question 6. Please analyze the contention that the Clean Air Act has shifted the balance of electricity generation from coal to natural gas. Using EPA's National Energy System data base, please discuss the amount of coal versus natural gas generation built between 1990 and 2003, and your projections for 2004 and beyond.

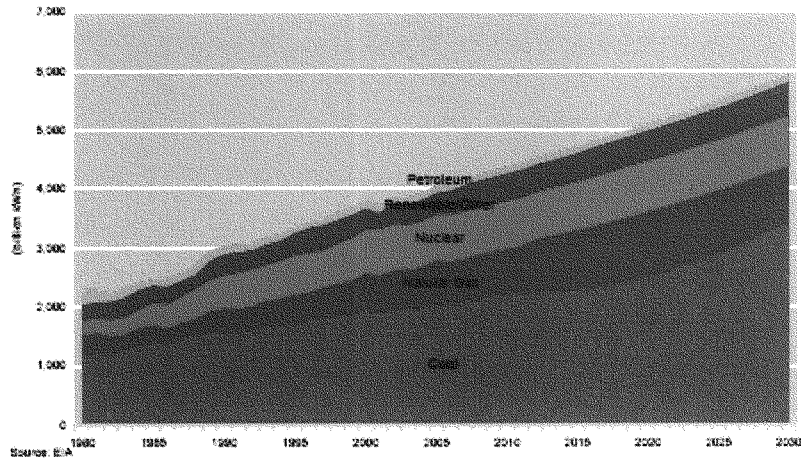
Response. Some observers have considered the limited number of coal-fired units and many natural gas units that have been built as an indication that the Clean Air Act has itself shifted the balance away from coal and toward natural gas. EPA's National Electricity Energy System Data base, which supports our electric generation modeling, indicates that between 1990 and 2003, 115 GW of new combined-cycle capacity has been added (690 units), while approximately 11 GW of new coal-fired capacity (68 units) has come online.³ Seventy-eight percent of this new combined-cycle capacity has come online since 2000, while 5 percent of the coal-fired capacity has come online in the same timeframe. From 2004 to 2007, we expect approximately 37 GW of new combined-cycle capacity (31 units) and approximately 1.2 GW of new coal fired capacity (4 units). As indicated previously, however, many dif-

²(National Petroleum Council, Natural Gas Meeting the Challenges of the Nation's Growing Natural Gas Demand, Volume II Task Group Reports, December 1999.)

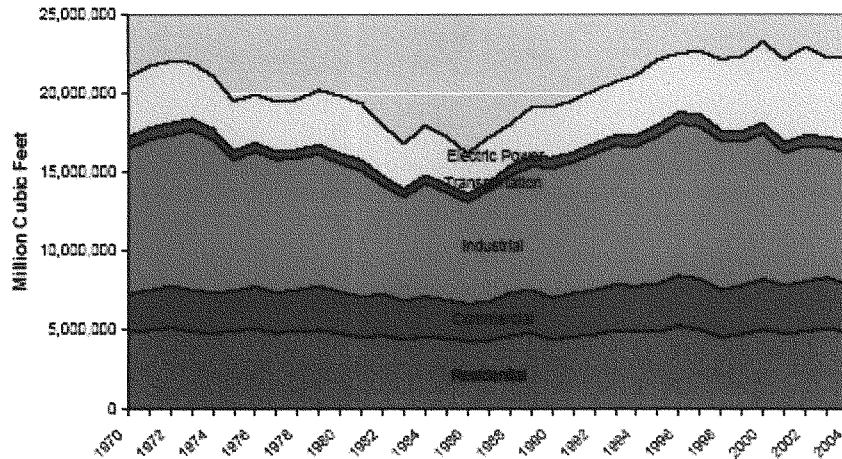
³Note that in addition to this combined-cycle capacity, approximately 1,900 turbines with a capacity of 87 GW were built in this timeframe for peaking purposes. These units consume relatively small amounts of natural gas.

ferent factors concerning the construction, permitting and fuel costs associated with natural gas versus coal units have come into play during this period which affect decisions concerning the installation of new capacity. The Figure immediately below shows this same effect occurring since the 1980's continuing into the next decade before narrowing after 2020. More broadly, as noted in the second figure, natural gas consumption for electric power generation has increased relative to other economic sectors since the late 1980's. Overall, coal-fired and natural gas generation increased substantially since 1980. While EPA predicts a gradual rise in both coal and natural gas used for electric power generation between now and 2020, projections for coal in the 2020–2030 range show increased coal utilization relative to natural gas.

Electric Generation Mix, 1980 to 2030
 Historical, 1980 to 2004; Projected to 2030



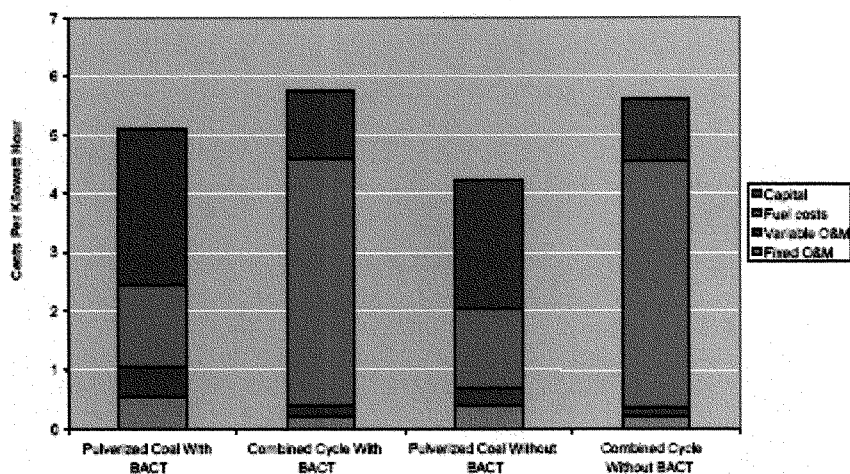
Natural Gas Consumption in the United States
 from 1970 to 2004



Question 7. As you know, natural gas prices have risen substantially since 1999. What effect has this had on the economics of natural gas based electricity generation? How will these high prices affect the economics of natural gas fired generation in the future?

Response. After 1999, natural gas prices rose substantially for a variety of reasons that the Energy Information Administration addressed in its testimony. This increase has now changed the economics considerably. Before the price increase, generation costs favored natural gas combined-cycle generation regardless of the environmental requirements. Today's higher natural gas prices are in turn increasing the operating costs of combined-cycle gas facilities relative to the costs for new coal-fired power plants. The figure below shows how this leads to changes in the comparative costs for new base load coal capacity versus natural gas capacity, however consideration for peaking capacity is different. Overall, the increase in natural gas prices is expected to lead to an increase in building of new coal-fired units in the future.

Comparison of the Electric Generation Costs of New Pulverized Coal and Natural Gas Combined-Cycle Units in Future (about 2010)



Note: The costs for new plants and fuels are based on various reports issued by Department of Energy and Energy Information Administration. The plant costs have been adjusted for the plant size and the year of operation, using the GDP implicit price deflator reported by Department of Commerce. The delivered cost for natural gas in this analysis is \$6.22/MMBTU and the delivered cost for coal is \$1.50/MMBTU. The costs of environmental controls are based on EPA's Integrated Planning Model.

Question 8. In your oral testimony you discussed the effect of existing Clean Air Act programs on the power sector and noted that "EPA has not seen evidence, however, that its regulations of the power sector are a substantial factor in the pricing of natural gas." Please provide an analysis of the effect of existing Clean Air Act programs on natural gas prices and fuel mix for the power sector. In particular, please provide specific analyses regarding the following programs: New Source Performance Standards, New Source Review, the Acid Rain Program, and the NOx SIP call.

Response. Many different provisions of the Clean Air Act may affect both the construction and operation of electric generating units and may influence fuel choices by the power industry. Electric generating units may be considered to be major sources subject to Title V permitting requirements. Other aspects of the Clean Air Act, including State implementation of National Ambient Air Quality Standards, may have an impact on fuel choices in particular States or regions. EPA has not retrospectively analyzed the impact of all Clean Air Act programs on fuel choices in the electric power generation sector and is unable to quantify, in the aggregate, all direct and indirect costs attributable to Federal and State implementation of the Act. However, EPA has carefully analyzed the potential impact of regulatory approaches on price and fuel mix when developing regulations for the four programs for which you requested specific analysis: the Acid Rain Program, the NOx SIP Call, the New Source Performance Standards, and New Source Review.

NEW SOURCE PERFORMANCE STANDARDS

In development of new source performance standards (NSPS), EPA has tried to incorporate approaches that encourage the efficiency of energy generation. The NSPS for NO_x for power plants are "output-based." Input-based emission limits had been the traditional method to regulate power plants until we amended the NSPS for power plants in 1998. An output-based standard establishes emission limits in a format that limits emissions per the amount of useful energy generated, not the amount of fuel burned. In addition to the output-based format, the NO_x NSPS has a single emission limitation for power plants that is applicable regardless of fuel type. We sought not to limit the control options available for compliance, but to provide flexibility for cheaper and less energy intensive control technologies (i.e., by allowing the use of clean fuels for reducing NO_x emissions). The clean fuel approach fits well with pollution prevention, which is one of the EPA's highest priorities. The fuel cost differential between gas and coal is one of the main concerns with the application of gas-based technologies for the reduction of NO_x from coal-fired boilers. Therefore, the revised NO_x limit was based on what a well-controlled coal-fired unit could achieve so as not to force the conversion to gas-firing.

In development of an NSPS, EPA assesses the regulatory impacts on options available for potentially affected firms, such as the option of substituting a different fuel (i.e., natural gas) versus the added regulatory costs of burning coal. NSPS are based on best demonstrated technology considering costs. Therefore, in developing an NSPS we try to minimize adverse effects on fuel markets or supplies. In the past we have subcategorized the NSPS for steam generating units by fuel type so as not to adversely affect one or the other.

NEW SOURCE REVIEW

New Source Review (NSR) is a preconstruction permitting program that serves two important purposes. First, it ensures that air quality is not significantly degraded from the addition of new and modified major air pollution sources such as industrial boilers and power plants. In areas with air that doesn't meet air quality standards, NSR helps prevent new emissions from slowing progress toward cleaner air. In areas with clean air, especially pristine areas like national parks, NSR helps prevent new emissions from significantly worsening air quality. Second, the NSR program assures that any large new or modified industrial source that significantly increases emissions will install state-of-the-art controls.

NSR works by requiring a permit before construction can begin on a new facility or on a modification to an existing facility that significantly increases emissions. The main requirement to obtain the permit is to install state-of-the-art control technology. Control technology decisions for a source are made on a case-by-case basis for the source being proposed. In areas that do not meet ambient air quality standards, sources must install Lowest Achievable Emission Rate (LAER) technology and also offset their emission increases. If a company is proposing to build a coal-fired power plant in such areas, the control technology decision will consider technologies demonstrated for controlling emissions from coal-fired boilers. Likewise, if a company proposes a gas-fired plant, the decision considers technologies applicable to such a plant. In attainment areas, the control technology decision (known as BACT) also allows for consideration of cost and energy impacts.

Since the NSR program was first enacted in 1977, we have seen variation in the choice of fuels companies use to meet industrial energy demand. There have been periods of expanded use of coal, and periods of expanded use of natural gas. As noted previously, the variation was driven by changing market forces and various other factors.

The President's National Energy Policy Report directed the EPA, in consultation with the Department of Energy (DOE) and other relevant agencies, to review the NSR program and to issue a report on the impact of the program on investment in new utility and refinery generation capacity, energy efficiency, and environmental protection. EPA identified several clarifications to rules and guidance to improve NSR applicability provisions and to help address the extreme demands being placed on our Nation's energy supply infrastructure.

Over the last 5 years, EPA has made some significant reforms to the NSR program in order to remove regulatory barriers to beneficial projects at existing facilities. Examples of beneficial projects include those that would improve reliability, safety, and efficiency, as well as those that would reduce emissions. Because the reforms, like the NSR program as a whole, operate independently of fuel choice, they should not affect fuel choice.

ACID RAIN PROGRAM

The Acid Rain Program, enacted in 1990, requires significant reductions in SO₂ and NO_x emissions from power plants nationwide. The centerpiece of the program is an innovative, market-based cap and trade approach to achieve a nearly 50 percent reduction in SO₂ emissions from 1980 levels.

This cap and trade approach provided greater certainty that reductions in emissions would be achieved and sustained by giving industry a performance standard—the SO₂ emissions cap—and unprecedented flexibility in how to achieve the needed emission reductions, through emission allowance trading. To assure compliance, sources provide a full accounting of their emissions through continuous monitoring and reporting, and face automatic consequences for failing to comply. The objective was for sources to find the most cost-effective means for limiting SO₂ emissions and to be responsible for achieving those emission reductions. There was no government second guessing or lengthy permit reviews.

By employing markets, allowing flexibility, and requiring accountability, the Acid Rain Program has had only minimal impacts on fuel markets. The program has not shifted the power industry away from coal-fired generation, which has actually increased since that time. Compliance occurred largely through two measures: fuel switching from higher to lower sulfur coals, and installation of scrubbers. EPA's assessment indicates that when Phase I of the Acid Rain Program began in 1995, close to 60 percent of the SO₂ emission reductions occurred through the switching to lower sulfur coals and close to 30 percent happened through the use of scrubbers.

Fewer than 2 percent of the reductions happened from switching to natural gas and about 2 percent of the reductions occurred from generation unit retirements.⁵ EIA and MIT's Center for Energy and Environmental Policy have performed similar evaluations with similar results.^{6,7} EPA has just finished the sixth year of implementation of the Phase II of the Acid Rain Program. EPA's monitoring of the program during this time indicates that compliance has largely occurred through continued coal-fired generation switching to lower sulfur coals and the installation of a limited number of additional scrubbers. There have been a few coal-fired generation unit closures. As Table 1 shows, however, fossil fuel fired electric generation from coal as a percentage of total electricity generation from fossil fuels has decreased slightly from 2000 to 2004, while generation from natural gas as a percentage of total electricity generation from fossil fuels has increased over the same period. Coal-based generation declined from approximately 73.4 percent of electricity generation from fossil fuels in 2000 to about 70.7 percent in 2004, while natural gas generation increased from 22.4 percent of electricity generation from fossil fuels in 2000 to approximately 25.0 percent in 2004, resulting in a total change in generation mix between coal and gas on the order of 5 percent during this period.

Table 1
Electric Generation by Fossil Fuels from 2000 to 2004
(Megawatt Hours)

	Coal	Natural Gas	Petroleum	Total
2000	1,966,265,000	601,038,200	111,221,000	2,678,524,200
2001	1,903,956,000	639,129,100	124,880,200	2,667,965,300
2002	1,933,130,000	691,005,700	94,567,390	2,718,703,090
2003	1,973,737,000	649,907,500	119,405,600	2,743,050,100
2004	1,976,333,000	699,609,700	117,591,000	2,793,533,700

Source: EIA AEO 2006.

Overall, capacity utilization of coal-fired generation continues to rise, increasing to a national average of 72 percent in 2004. Over longer timeframes, the relative share of total fossil generation has not changed substantially. The percentage of generation from natural gas remained around 20 percent, whereas, the coal-fired percentage remained around 75 percent.

⁵ U.S. Environmental Protection Agency, National Allowance Data Base, Version 2.11 and Acid Rain Scorecard Report, 1996.

⁶ Energy Information Administration, The Effect of Title IV of the Clean Air Act Amendments of 1990 on Electric Utilities: An Update, March 1997.

⁷ Denny Ellerman et. al., Markets for Clean Air The U.S. Acid Rain Program, 2000.

NOX SIP CALL

The NOx SIP Call program is a cap and trade program that EPA designed under Clean Air Act authority governing the interstate transport of pollutants. It regulates seasonal NOx emissions from the electric power industry and industrial sources in the eastern United States to reduce smog (ozone levels). Currently, 19 States and the District of Columbia are participating in the program.⁸ EPA designed the program so that most of the reductions would occur through the installation of advanced post-combustion controls on coal-fired generation units. During the development of the program, EPA forecast there would be some limited fuel switching to natural gas, increasing its use by the power sector in the States covered by the program one to 2 percent, but found this would not result in an appreciable increase in natural gas prices.⁹

Table 2 shows the fossil fuel-fired electric power generation mix at facilities covered by the program before the program began in 2002 and during the first 2 years of implementation. Natural gas use is actually slightly lower in 2003 and 2004 than 2002 while coal and oil use increased. Specifically, natural gas represented 12 percent of net generation in 2002 and 11 percent in 2004, while coal remained around 85 percent. Again, the relative share of the generation mix does not change substantially.

Table 2
Fossil Generation in the NOx SIP Call States and DC
for 2002 to 2004
(Megawatt Hours)

	Coal	Natural Gas	Petroleum	Total
2002	1,044,509,188	150,052,642	36,796,384	1,231,358,214
2003	1,053,326,763	118,306,320	51,943,227	1,223,576,310
2004	1,057,178,477	135,595,152	52,072,012	1,244,845,641

Source: EIA web site, 2005.

While the generation mix has remained relatively stable, there have been substantial improvements in the Nation's air quality in our efforts to address smog. A recent EPA report shows that in most of the metropolitan areas of the East, after weather corrections, ozone reductions through government-sponsored programs doubled over the last 2 years due to the NOx SIP Call.¹⁰

Question 9. Please provide an analysis of the impact of future regulatory programs on natural gas prices and fuel mix for the power sector, specifically the Clean Air Interstate Rule, the Clean Air Mercury Rule and the Clean Air Visibility Rule (CAIR/CAMR/CAVR), comparing the base case with and without these rules. Please also provide a projection of the effect of these rules combined on natural gas prices at the Henry Hub for 2010 and 2020.

Response. Modeled on Clear Skies legislation, the Clean Air Interstate Rule (CAIR), Clean Air Mercury Rule (CAMR)—and the Clean Air Visibility Rule (CAVR) that EPA finalized in 2005 were designed to ensure that we can achieve dramatic air quality benefits that do not compromise economic growth and our energy mix. The CAIR/CAMR rules, based on the Acid Rain Program and the NOx SIP call, will give industry flexibility in how to achieve the needed emission reductions, allowing industry to make the most cost-effective reductions and limiting impacts on consumers. CAVR also has a provision that allows States individually or regionally to set up cap-and-trade programs to operate in place of current technology standards.

If States choose to participate in the CAIR and CAMR cap and trade programs as EPA recommends, power plants would be allowed to choose the pollution reduction strategy that best meets their needs (e.g., installing pollution control equipment, switching to lower sulfur coals, buying excess allowances from plants that have reduced their emissions beyond required levels). EPA has set overall emission

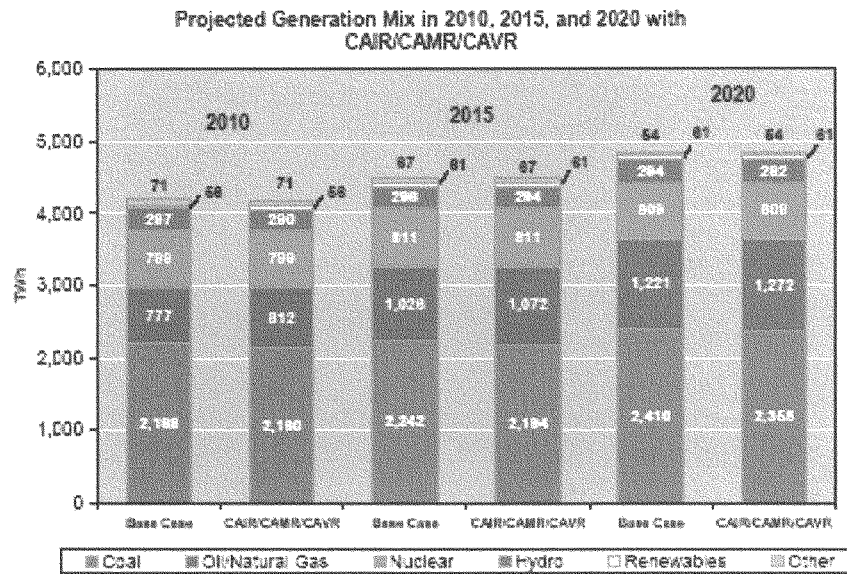
⁸The NOx SIP Call States include AL, CT, DC, DE, IL, IN, KY, MA, MD, MI, NC, NJ, NY, OH, PA, RI, SC, TN, VA, WV.

⁹U.S. Environmental Protection Agency. "Economic Impact of the NOx SIP Call on Electric Power Generation", paper presented at the Electric Utilities Environment Conference, January 1999.

¹⁰U.S. Environmental Protection Agency, Evaluating Ozone Control Programs in the Eastern United States: Focus on the NOx Budget Trading Programs, 2004, August 2005.)

levels that are needed to meet air quality goals, and allows market forces to influence the best compliance options for various facilities. Also, the CAIR and CAMR programs are phased in over time with considerable advance notice to allow the power industry and fuel markets to adjust and avoid price increases that rapid changes may produce.¹¹ CAVR goes into effect in 2014.

In Clear Skies legislation, CAIR and CAMR, EPA tried to ensure a level playing field, including phased-in reductions, for example, and reasonable control levels that could be achieved with cost-effective reductions. The large emission reductions required by Clear Skies are set so that rational, economic installation of pollution controls on coal-fired units can occur rather than by switching to natural gas. From analysis that EPA released in the fall 2005, the Figure below shows what EPA expects to occur for the electric generation mix with and without (base case) CAIR, CAMR, and CAVR.¹² The differences from the base case between natural gas and coal-fired generation are almost imperceptible.



Additionally, EPA expects that these three programs combined will at most increase natural gas prices by 1.6 percent in 2010 and 2.8 percent in 2020 at Henry Hub and be much less of an impact directly on consumers, who will pay for added transmission and distribution costs that will be largely unaffected by these rules.¹³ EPA has performed sensitivity analysis using higher natural gas prices which shows that even at prices significantly higher than recent levels, gas prices would not increase beyond originally forecasted levels of 1.6 percent in 2010. After 2010, EPA found that assuming higher natural gas prices actually has the effect of reducing the impact of EPA regulations on natural gas prices because it becomes more cost-effective to use other sources of fuels to meet electricity demand.¹⁴

Many believe that natural gas prices are likely to be higher over the next several decades than the Agency used in our analysis. Higher gas prices would make switching to natural gas as a compliance option a less attractive economic option, therefore if gas prices turn out to be higher, there is likely that there will be even less switching to natural gas than EPA projected.

¹¹ For CAIR, the first phase of the program commences in 2009 for NOx and in 2010 for SO₂. The second phase for both pollutants begins in 2015. For CAMR, the first phase is in 2010 and the second phase is in 2018.

¹² U.S. Environmental Protection Agency, Multi-Pollutant Analysis: CAIR/CAMR/CAVR, October 2005.

¹³ Henry Hub is the pricing point for natural gas distribution in the East from the Southeast and Outer Continental Shelf. EPA's sensitivity analysis increased gas prices by 75 percent, 100 percent and 150 percent.

¹⁴ Ibid.

Question 10. Please list and discuss any air programs not listed above that reduce the demand for natural gas.

Response. EPA runs a number of voluntary partnerships authorized under the Clean Air Act that work to provide more natural gas supply by encouraging companies to improve the efficiency of natural gas delivery and use, improve electric end-use efficiency, and provide new renewable energy sources. EPA analysis indicates that in 2010, these voluntary programs will have reduced national demand for natural gas by 3 percent. For example, in 2004, the Natural Gas STAR program, a voluntary partnership between EPA and the oil and natural gas industry, offset the equivalent of 61 billion cubic feet of natural gas. Since the Program began in 1993, Natural Gas STAR partners have reduced natural gas/methane losses by 405 billion cubic feet (Bcf). At the same time, these companies have saved over a \$1.2 billion by keeping more gas in their systems for sale in the market. EPA's flagship Energy STAR program has been very successful at reducing natural gas and electricity demand. For example, in 2004, with the help of ENERGY STAR, Americans saved 125 billion kilowatts and 25,000 megawatts of peak power, the amount of peak energy required for about 25 million homes. This energy savings represented about 4 percent of total U.S. electricity demand in 2004. Energy STAR and Natural Gas STAR are just two examples of the environmental and energy savings benefits that can be achieved by a well-designed voluntary effort.

Question 11. Does the Agency believe that Clean Air Act regulations are a substantial factor in the pricing of natural gas? Is this conclusion based on a review of the available information and a considered analysis of that information, including publicly released projections and previous agency analysis or does it simply reflect an overall lack of information regarding the effect of EPA's Clean Air Act regulations on natural gas prices?

Response. Clean Air Act regulations impose a cost on the regulated community that affects the demand for natural gas, although we do not believe it is a substantial factor in the pricing of natural gas. More importantly, the Agency is sensitive to of the need to design regulations and policies which maintain our Nation's diverse fuel mix and is committed to being a part of the solution to the challenges faced by our Nation's energy supply infrastructure.

The Bush administration has worked to advance clean coal technologies and encourage their use in the generation of electricity. This policy not only ensures a secure source of electricity supply, but also increases the availability of natural gas for critical industrial and residential uses. An important element of this policy is the enactment of Clear Skies. It is a powerful tool to address fuel supply issues.

Question 12. Have the answers to the previous questions been reviewed and approved by the Office of Management and Budget?

Response. Yes. Developing answers to Congress is a collaborative effort and inter-agency review is a common practice in the Federal Government. OMB, along with other agencies like DOE, was offered an opportunity to comment on these materials.

Question 13. A recent study funded by EPA has found that 67 percent of the mercury in rain at an Ohio River valley site originated from power plants. The study was conducted between 2003 and 2004 in Steubenville, OH. These results were known within the Agency in April 2005. They are directly relevant to the question of the development of hot spots as a result of the cap and trade of mercury air emissions. Why then were they not even mentioned in the Clean Air Mercury Rule (CAMR) promulgated in May of 2005? Why does the CAMR conclude that only 8 percent of U.S. Mercury deposition comes from power plants without reference to this study? Doesn't that suggest that the CAMR rule may be fundamentally flawed?

Response. The Steubenville study was not relied on in the CAMR rulemaking because it had not undergone peer review or been finalized as of our court-imposed deadline for completing CAMR. EPA's air quality modeling in support of the Clean Air Mercury Rule (CAMR) showed that about half of the mercury deposited in the area around Steubenville comes from U.S. power plants, while up to 70 percent of mercury deposition in areas just east comes from U.S. power plants. The Steubenville study cannot be directly compared with the model results because the Steubenville study included sources other than U.S. power plants and used a different time-frame for its analysis. However, the results appear to be generally consistent with our modeling in suggesting that a significant fraction of the mercury deposited in the area comes from power plants. As power plants in the area respond to CAIR and CAMR by installing scrubbers, SCRs, and mercury-specific controls this fraction will be reduced—more than an 80 percent reduction in Ohio and about a 90 percent reduction in neighboring States of Pennsylvania and West Virginia.

Question 14. We understand that this study and its results were presented to EPA Headquarters personnel, including Jeff Holmstead, during the summer of 2005. Is that correct? Please provide the notes, slides and other presentation materials from that meeting and any other meetings relating to this issue.

Response. A presentation on the preliminary results from the Steubenville mercury deposition source apportionment study was given to Jeff Holmstead on July 5, 2005. Note that the results presented to Jeff Holmstead were still preliminary and are part of the deliberative process.

Question 15. We understand that a presentation of these results was made to Mr. Tim Oppelt, Acting Director of EPA's Office of Research and Development on April 27, 2005. That presentation references additional analysis to finalize results, which were projected to be completed within a month of April 2005. Are the final results complete? Please provide them if so.

Response. The presentation given to Tim Oppelt on April 27, 2005 provided preliminary results from the Steubenville Study. After the presentation, additional analyses have been performed and peer reviewed although the study has not yet been published.

Question 16. Slide 6 of the presentation to Mr. Oppelt demonstrates that 90 percent mercury emissions reductions from the coal-fired utility industry can achieve approximately 50 percent reductions in total mercury deposition over the Ohio River valley. The Agency has finalized a rule asserting that delisting the industry (and the elimination of the requirement to do a MACT standard) is justifiable on the basis that only an insignificant amount of mercury deposition is attributable to domestic power production. Is the Agency's position consistent with the facts presented to Mr. Oppelt?

Response. As part of the analysis to support the 112(n) revision notice EPA estimated the resulting change in mercury deposition for the continental United States resulting from a 100 percent reduction in U.S. power plant emissions—a utility "zero-out" analysis. EPA then estimated the change in mercury deposition after CAIR and furthermore after CAMR. Based on these model runs, we estimate that CAIR and CAMR will reduce most of the mercury deposition due to power plants in the Ohio River Valley in large part because CAIR is particularly effective in reducing oxidized mercury emissions—those most likely to deposit within the United States.

Question 17. According to the presentation provided to Mr. Oppelt there are other sites being studied. Please produce the results of those studies.

Response. The other sites you reference are not operated by EPA (most of the sites mentioned are operated by the University of Michigan, a collaborator in the Steubenville study). To date, EPA has not been given access to data from these sites. In addition, the data from these sites are measurement data and the statistical source apportionment models would have to be applied to these data to generate results similar to those presented from the Steubenville study.

Question 18. One of the slides in the Oppelt presentation (Slide 16) describes the researchers' "Planned Next Steps"—have any of these next steps have been taken? If not, why not?

Response. Several of the next steps on slide 16 have been taken. Specifically, the review of the receptor modeling results has been completed; analyses of peak events were conducted to support interpretation of the final results; materials were prepared for EPA and OAR dissemination; and a manuscript has been prepared and submitted for publication. The remaining items, listed under "Future Work," are future research analyses that we plan to undertake as additional data from Steubenville, and other sites operated by others outside of EPA become available to EPA researchers.

Question 19. In the preamble to the final revision of the December 2000 finding on HAPs emissions (including mercury) from electric power plants, EPA said that if new information became available that raises the possibility of utility-attributable hotspots EPA would take appropriate action. This study clearly raises that possibility. What appropriate action will EPA take to deal with hotspots?

Response. Through the authority of section 111 of the Clean Air Act, EPA has the requirement to review and revise, as necessary, the new source performance standards (NSPS) every 8 years. In addition to that statutory provision, the Agency did clearly articulate in the preamble that appropriate actions would be taken should utility-attributable hotspots be identified in the future. At this point, we do not believe it is appropriate to link the preliminary Steubenville results causally to the identification of a utility-attributable hotspot. There are numerous other coal com-

bustion sources within the Steubenville perimeter, which also likely contribute to the measured mercury deposition.

It is worth noting that elevated deposition does not necessarily translate into elevated levels of methylmercury in fish because of the complex ecosystem processes (for example, methylation and bioaccumulation rates) that must occur. The Office of Air and Radiation will continue to work with the Office of Research and Development to ensure that our decisions are informed by the best available science including the Steubenville study once it is published.

Question 20. In a trading program, firms operating in a market decide where emissions reductions will take place, rather than a regulatory authority requiring that particular sources control emissions. There is therefore no assurance under such a program that reductions will take place where they are needed to protect public health. Now that we know that there is at least one place in the country where utilities are responsible for most of the mercury deposition, and there are likely to be many others, does EPA plan on changing its rule to require that reductions will take place in areas where they are needed? Will EPA continue to insist on mercury trading, despite the evidence presented in the Steubenville study?

Response. EPA does not plan to change the rule at this time and continues to support the cap and trade approach. Under a cap-and-trade approach, most of the reductions are projected to result from larger units installing controls and selling excess allowances, due to economies of scale realized on the larger units versus the smaller units. Indeed, EPA's modeling of trading programs demonstrates that large coal-fired Utility Units, which tend to have higher levels of Hg emissions, will achieve the most cost-effective emission reductions. These units are more likely to over-control their emissions and sell allowances, than to not control and purchase allowances. This model prediction is consistent with principles of capital investment in the utility industry. Under a trading system where the firms' access to capital is limited, where the up-front capital costs of control equipment are significant, and where emission-removal effectiveness (measured in percentage of removal) is unrelated to plant size, the utility company is most likely to allocate pollution-prevention capital to its larger facilities than to the smaller plants (since more allowances will be earned from the larger facilities). Economies of scale of pollution control investment will also favor investment at the larger plants. Further, insofar as large coal-fired Utility Units tend to be newer and/or better maintained than medium-sized and small facilities, it can be expected that companies will favor investments in plants with a longer expected lifetime.

These modeled predictions are consistent with the pattern of behavior that EPA and others have observed over the past decade through implementation of the SO₂ emissions trading program under Title IV of the CAA. Thus, under a cap-and-trade program, Hg reductions result from units that are most cost effective to control, which enables those units that are not considered to have cost effective control alternatives to use other mechanisms for compliance, such as buying allowances. By contrast, regulating pursuant to a control regime like section 112(d) does not result in the cost efficiencies that are attendant a cap-and-trade program. For example, under section 112(d), each facility must meet a specific level of emission control, which can result in increased compliance costs, particularly for the smaller Utility Units given economies of scale.

It is important to note that the Steubenville site was selected in part because it was anticipated that it would be affected by utility emissions, which is consistent with CAMR modeling analyses. The relative contribution of local and regional coal combustion sources, such as electric utilities, to mercury deposition in other areas of the country will vary significantly.

Question 21. According to an article published in Greenwire on February 15, 2006, EPA's Policy Advisor to the Assistant Administrator, Jason K. Burnett, is reported as saying that "the Agency has known all along that the industrial Midwest stands out as a region where mercury would be driven up by industrial sources." If that is so, why does the fact sheet on the EPA web page for the CAMR say that mercury from U.S. power plants is only 1 percent of the global pool? Why is there a bar chart on the EPA web page showing less than 8 percent of the deposition in the United States is coming from U.S. power plants? Were these documents accurate when they were created? Are these documents still accurate? If not, does EPA have plans to correct them?

Response. The Agency has clearly and consistently communicated that there are regional differences in mercury deposition from U.S. sources, including power plants. In the preamble to the final 112(n) Revision Rule we describe not only the average utility deposition but the 90th percentile, the 99th percentile, and the maximum deposition in Table VI-5 on 70 FR 16019. The technical support documents

show that a significant fraction of the deposition in parts of the Midwest is from U.S. sources (see <http://www.epa.gov/ttn/atw/utility/aqm—oar-2002-0056-6130.pdf>). Maps showing the regional variation have been used in congressional testimony (see Testimony of Jeffrey Holmstead Assistant Administrator, U.S. Environmental Protection Agency, Before the Energy and Air Quality Subcommittee, Energy and Commerce Committee, U.S. House of Representatives, May 26, 2005), by your colleagues on the Senate floor, and in many other venues. While containing some uncertainty, this information was and is the Agency's best estimate of the contribution of mercury deposition from various sources.

While communicating the regional differences, we also have communicated that mercury exposure is generally a global issue since ninety percent of the fish and shellfish we eat are from the marine environment; and nearly 80 percent of those are imported. Because the United States represents just a few percent of global man-made mercury emissions, we cannot expect a quick fix to the global mercury problem from controls on U.S. sources.

For the foreseeable future, EPA advises that women who may become pregnant, pregnant women, nursing mothers, and young children carefully observe the joint EPA-FDA Fish Advisory issued last year. We are also committed to working collaboratively with those countries that are the largest sources of airborne mercury to help them reduce those emissions to the global pool. Our actions reduce our contribution to the global pool and promote the technologies so other countries can follow our lead.

Question 22. EPA used the Community Multi-scale Air Quality model to estimate mercury deposition. However the modeling utilized a 36 kilometer grid, which is too large a grid to distinguish local deposition. A smaller grid, such as a 12 kilometer grid would do a much better job of portraying the local impact of power plants on mercury deposition. Given this new study, will EPA redo the modeling with a smaller grid size, such as 12 kilometers?

Response. EPA's reasoning for using a 36-km grid square size was discussed in the final CAMR and supporting documentation. This documentation outlined three reasons for using a 36-km grid square size as opposed to a smaller size. First, the larger grid size would account for Hg deposition that enters a watershed through subsurface inflow and runoff, as opposed to a smaller grid size which may only account for direct inputs to surface water. Second, in larger water bodies where there is substantial fishing activity, the fish species consumed by humans are likely migratory and the accumulation of Hg in these fish will come from deposition over a larger area. Third, many anglers may catch fish from a variety of water bodies in a watershed; thus, a larger grid size would account for this fishing pattern.

Question 23. Please provide all documents in your possession authored by you or received by you from persons outside EPA that relate to the Steubenville study, mercury trading and mercury hotspots.

Response. I am supplying you with all responsive documents in my possession that are not privileged.

Question 24. In January, a month after EPA proposed to revise the fine particle ambient air quality standards (PM_{2.5} NAAQS), EPA issued a draft regulatory impact assessment (RIA) of the costs and benefits of the proposed standards and several alternatives. The Clean Air Act requires that the Administrator set the NAAQS based on what is requisite to protect public health with an adequate margin of safety, and precludes consideration of costs until later in the process when the standards are being implemented. Nonetheless, the RIA can provide useful information for the public and congressional debate regarding the NAAQS and can assist States and EPA when they implement the NAAQS. I am concerned that the public and congressional debate will not benefit from a final RIA that takes the same analytical approaches as the draft RIA. As EPA acknowledged in the draft RIA and in briefings to Senate staff, the draft RIA has some significant limitations. Chief among these is that it focuses on the costs and benefits of achieving the proposed and alternative PM_{2.5} standards in 5 cities, rather than on a national basis. EPA staff indicated that the final RIA will correct some of these limitations and will have some significant differences from the draft RIA, although EPA is unlikely to have time to release another draft for public comment before finalizing the RIA.

Because I am concerned that the RIA will not provide information that I believe would be useful for congressional and public debate of the PM_{2.5} NAAQS and for later State implementation efforts, please provide a national cost-benefit analysis for attainment of each of the following sets of standards:

Annual	Daily
15	35
15	30
14	35
14	30
14	25

As you did in the draft RIA, please use a hierarchy of controls. The first level of controls should include two programs: a national cap and trade program for power plant SO₂ and NOx emissions at the levels that can be achieved at a cost of \$2000 per ton and a national cap and trade program for industrial boilers that can be achieved at the same cost effectiveness level. The second level of controls should be diesel retrofit programs funded at the levels contained in the Presidents 2007 budget every year for the next 10 years. For areas projected to be out of attainment after those controls are imposed, for each area, please follow the control hierarchy EPA intends to use in the final RIA.

In addition to projecting the health benefits and monetizing them, please project which areas would come into attainment using the control scenarios described above. In projecting the benefits, please model premature mortality associated with PM exposure as a non-threshold effect, that is, with harmful effects to exposed populations regardless of the absolute level of ambient PM concentrations.

Before conducting this analysis, please discuss details with my staff so that we can ensure the analysis is useful.

Response. For the final rule on the National Ambient Air Quality Standards for Particulate Matter, which will be issued by court-imposed deadline of September 27, 2006, EPA will be preparing a final Regulatory Impact Assessment (RIA). As part of this RIA, EPA plans to estimate nationwide costs and benefits of illustrative implementation strategies to demonstrate how the Nation might attain the proposed standards in 2020, along with costs and benefits of partial attainment strategies in 2015. Our benefits assessment will include an analysis of the incremental health benefits, including preventing premature mortality, in each of these years across the entire Nation. In addition to the proposed standards, we plan to analyze the costs and benefits of an alternative combination of standards of 14 µg/m³ annual and 35 µg daily among other options. We will also provide a more limited assessment of the costs and benefits of the proposed annual standard of 15 µg/m³ combined with a 30 µg/m³ daily standard. In analyzing these alternative standards, we will evaluate a wide range of potential emissions controls, including local measures, and where appropriate and necessary, regional control programs for certain pollutants and sectors. These programs may, if necessary and cost-effective, include industrial boilers and diesel retrofits as part of the overall mix of controls. As part of the outputs of our modeling exercise, we will project areas that attain and any residual non-attainment areas. As in the benefits analysis for the proposed rule, we will include estimates of changes in premature mortality based on a threshold set at natural background (which is functionally equivalent to assuming a non-threshold model given current and projected baseline ambient PM concentrations) among other options. Given the tight schedule for completing this RIA, we have already begun our analysis. We do not believe that we have sufficient time or resources to extend the analysis to encompass your request. We would be happy to brief EPW or your staff on progress with the analysis or details of the methodology. We will also be happy to share the results of this analysis with you as soon as we can.

Question 25. In its recent brief before the United States Court of Appeals for the District of Columbia Circuit regarding EPA's Equipment Replacement Rule, (ERP), EPA argues that a plant cannot replace itself in its entirety (or in large part) by rebuilding itself in increments of 20 percent or less because of EPA's aggregation policy. As an initial matter, is there anything specific in the current aggregation policy that directly prohibits a plant from rebuilding itself 20 percent at a time over 5 years? Please identify and describe this policy. Is the aggregation policy under review in any way? Are any changes to the aggregation policy being considered that would allow plants to rebuild themselves in 20 percent increments, or that would allow more numerous and greater increases while avoiding NSR when compared to the current aggregation policy? Please provide all documents in your possession authored by you or received by you from persons outside EPA that relate to consideration of changes to the aggregation policy.

Response. EPA's aggregation policy is in need of clarification. We concluded this in our 2002 review of the NSR program and our subsequent Report to the President,

which recommended, among other things, that EPA “clarify [that] a project would be considered separate and independent from any other project at a major stationary source unless the project is dependent upon another project to be economically or technically viable.” We are currently working on a rulemaking to implement this recommendation and expect a proposal by this summer. The proposal would clarify our current aggregation criteria, not change them. As part of that clarification, we plan to take a position consistent with what we have argued in the brief you cite. That is, our aggregation policy requires aggregation of projects unless they are technically or economically independent. Further, consistent with our brief, we believe that a program to rebuild an entire plant in 20 percent increments would comprise a set of actions that were not independent, and would need to be aggregated for NSR purposes.

I am supplying you with all responsive documents in my possession that are not privileged.

Question 26. On October 13, 2005, EPA proposed changes to the New Source Review (NSR) program as it relates to utilities. That same day, Deputy Administrator Peacock released a memorandum related to NSR enforcement that stated that “in deciding which cases to pursue, it is appropriate to focus on those that would violate our NSR reform rules and our latest NSR utility proposal which the Agency is releasing today.” In order to clarify the application of this document for the public, please indicate whether the phrase “our NSR reform rules” from that document refers or does not refer to the Equipment Replacement Rule that was stayed by the United States Court of Appeals for the D.C. Circuit. If you claim that such a clarification is confidential or privileged, please explain how clarification of the application of a publicly released document is confidential or privileged.

Response. The regulated community must comply with all applicable regulations, including existing NSR requirements. Because the Agency’s Equipment Replacement Rule (ERP) has been stayed by the U.S. Court of Appeals for the District of Columbia Circuit, it was not part of “our NSR reform rules” at the time of the Peacock Memorandum, and consequently, the regulated community currently has no legal right to implement the ERP. We note that, since the D.C. Court vacated the ERP on March 17, 2006, the ERP continues not to be part of our rules.

Question 27. With regard to the NSR changes proposed by the EPA on October 13, 2005, how many of EPA’s settled and pending NSR enforcement cases would have been viable, if any of the options proposed by the Agency in that rulemaking had been in effect at the time of the violation? If the Agency has not conducted this analysis for some or all of the cases, will it do so and provide these results to the committee? If you claim a privilege with regard to this information please identify the privilege and explain how providing numbers of cases, without any identifying information, violates the privilege.

Response. The proposed NSR rules plainly and expressly state that they are to be applied to changes that post-date the rules’ respective effective dates and thus shall not affect the existing enforcement cases. EPA intends to continue to vigorously pursue the existing enforcement cases and other matters in negotiations. In addition, EPA will continue to focus on those cases that would violate our “NSR reform rules” (as described in response to question 24 above) and our latest utility proposal.

With respect to whether or not EPA has considered, or is considering, the impact of the rules on the settled and pending NSR enforcement cases, it is EPA’s longstanding policy not to comment on the specific enforcement-sensitive aspects of the enforcement cases. That a matter is settled or closed does not cause an otherwise applicable common law or statutorily based privilege to no longer apply to that matter. Any assessment performed by attorneys or at the direction of EPA’s attorneys regarding the impact that a newly promulgated or proposed rule might or might not have on settled or pending cases would be protected from disclosure by application of the attorney-client privilege or attorney work product doctrine. EPA has a number of cases in active litigation at this time, and there are many common issues of fact and law between these cases and those that are pending or resolved. Thus, disclosure of an EPA assessment of whether or not the pending or settled cases would have been viable in light of the October 13, 2005 rulemaking is privileged.

Question 28. A recent letter written by Stephen D. Page, Director of the Office of Air Quality Planning, concludes that an analysis for a coal fired power plant of Best Available Control Technology (or Lowest Achievable Emissions Rate), under the Clean Air Act, need not include evaluation of Integrated Gasification Combined Cycle plants. This letter was issued on December 13, 2005 in response to a letter from Mr. Paul Plath, of E3 Consulting, Englewood, Colorado. This position, which

was not reached pursuant to notice and comment rulemaking, appears to be inconsistent with the Administration's expressed desire to promote the use of IGCC as a means of reducing air pollution, including emissions of greenhouse gases. Nor does it appear consistent with previous positions regarding BACT and LAER. I would like to know whether EPA plans on adopting this position through notice and comment rulemaking. I would also like to know whether you and/or Administrator Johnson approved this position and your role in developing and arriving at this position. When did you first become aware of this issue and did you make contact with Mr. Plath or other parties outside EPA regarding this issue prior to issuance of the letter? Which parties and when? Please provide all documents authored by you or received by you from persons outside EPA that you have regarding the development, issuance and approval of this letter.

Response. We are currently considering the possibility of adopting this interpretation through rulemaking. Both the Administrator and myself concurred with the Page memo. I played a substantive role in developing this interpretation. I have not personally been in contact with Mr. Plath. The issue first came to my attention when it was raised by petitioners in Title V permit actions. I do not recall the particular action in which it first was raised. At the request of outside parties, I had two meetings regarding this issue. The first meeting occurred on December 2, 2005, and included the following people: Teresa A. Gorman, Joe Stanko, Hillary Sills, Randy Randol, and Shawn Glacken. The second meeting took place on March 16, 2006, and included Vickie Patton and Mark McLeod of Environmental Defense, and David Hawkins of Natural Resources Defense Council. In addition to myself, other EPA personnel were in attendance. No additional meetings were requested.

There are no documents responsive to your request that are not privileged.

Question 29. A recently leaked memorandum from Deputy Administrator Marcus Peacock sets out a plan to review the process for National Ambient Air Quality Standards (NAAQS) in order to see whether that process can be strengthened. The NAAQS are a cornerstone of the Clean Air Act and the process for setting NAAQS has widely been heralded a leading example of exhaustive, peer reviewed scientific effort. The NAAQS and the processes that have developed these standards have repeatedly been validated by the courts. The Peacock memo sets an ambitious plan for reviewing that process and suggesting changes by April 3, 2006. You, together with Assistant Administrator George Gray are the recipients of the process and will head up the workgroup. The secretive nature of the initial memo, the small number of participants in the process and the speed at which recommendations are to be made regarding fundamental elements of the Clean Air Act are cause for concern. Will this review of the NAAQS process be open and public? Who will participate in the process? Will parties outside the EPA participate, including representatives of the White House or Office of Management and Budget? What is the process for implementing any recommendations that may result? Why is the deadline April 3, 2006? What concerns about the NAAQS process specifically lead to this review? Have you had contacts with parties outside EPA prior to or during the review regarding this issue? Please list these contacts and provide all documents or information relating to such contacts.

Response. On December 15, 2006, Deputy Administrator Marcus Peacock issued a memo requesting a "top-to-bottom" review of the NAAQS process. This review was prompted by a desire to ensure that the best available science is being used to accelerate environmental progress and protect public health. Because of the importance of the NAAQS review process, and because the Agency has some discretion over certain steps in this process, the Administrator wants to ensure that we are utilizing the most rigorous, up-to-date, and unbiased scientific standards and methods.

To fulfill the Deputy Administrator's request, EPA established a working group co-chaired by Dr. George Gray, Assistant Administrator of EPA's Office of Research and Development, and myself. This working group comprises a team of experienced managers who have been involved in the NAAQS review process for many years, including representatives from our Office of Research and Development, Office of Air and Radiation, Office of General Counsel, and Office of Policy, Economics, and Innovation. This team established the structure for our review of the NAAQS review process, determined how to involve external stakeholders, and decided what types of outputs will be most helpful for strengthening the NAAQS review process.

The working group reviewed previous assessments of the NAAQS review process and other relevant documents. Furthermore, the group developed a list of key questions that are being used to guide the Agency through this process. These questions, which are listed below, focus on central issues such as the timeliness of the NAAQS review process; how to ensure consideration of the most recent available science; dis-

tinctions between science and policy judgments; and how to identify, characterize, quantify, and communicate uncertainties in scientific information.

In addition to helping EPA structure its internal discussions, these framing questions are being used to solicit input from external stakeholders. As a first step, on February 10, 2006 George Gray and I participated in an administrative meeting with members of our Clean Air Scientific Advisory Committee (CASAC), which is EPA's main scientific advisory partner in the NAAQS process. We described the charge from the Deputy Administrator and invited current and former CASAC members to provide individual input as the process moves forward. In addition to seeking input from CASAC members, we have scheduled a limited number of meetings with stakeholder groups that have a history of significant involvement in the NAAQS review process. The list of meetings that have occurred to date and the stakeholder groups involved are attached below. We have also briefed members of your staff as well as of other congressional committees. The EPA working group took the perspectives and recommendations expressed during these stakeholder meetings into consideration as it developed its recommendations to the Deputy Administrator. Included with the provided documents you will find a copy of CASAC members and other stakeholders' comments, the workgroup report to Deputy Administrator Peacock, and other relevant agency documents.

We recognize both the importance of undertaking a thorough review and the complexity of the issues involved. Because we hope that the working group's findings may help inform ongoing NAAQS reviews, including the reviews of the NAAQS for ozone, lead, nitrogen dioxide, and sulfur dioxide, we are striving to make rapid progress. Toward this end, the EPA working group provided initial recommendations to the Deputy Administrator on April 3, 2006. These recommendations included key questions about the NAAQS process that need further study, and basic themes or ideas for further development. This will be an ongoing process that did not conclude on April 3d, and there will be additional opportunities for input by a broader group of stakeholders.

KEY QUESTIONS FOR THE REVIEW OF THE PROCESS FOR SETTING NAAQS

Timeliness of the NAAQS review process

- What are your views on the timeliness and efficiency of the current process for both EPA's and CASAC's reviews of the air quality criteria and the NAAQS, in terms of the time that is spent between the start of the review and the publication of the Agency's proposed decisions on the standards?
- Can you identify structural changes to the process and/or key documents (e.g., the Criteria Document, Staff Paper, Risk Assessment) or changes in the Agency's management of the process that could shorten this timeframe while preserving an appropriately comprehensive, transparent and policy-relevant review and allowing adequate opportunities for CASAC review and advice and for public comment on these documents?

Consideration of the most recent available science

- To enhance the Agency's ability to take the best and most recent available science into account in making decisions on the standards, can you suggest changes in the process and/or key documents that could shorten the time between the presumptive cutoff date for scientific studies evaluated in the review and reaching proposed decisions on the standards, or that could otherwise facilitate appropriate consideration of more recent studies?

Distinctions between science and policy judgments

- Recognizing that decisions on the standards, while based on the available science, also require policy judgments by the Administrator, what are your views on how clearly scientific information, conclusions, and advice are distinguished from policy judgments and policy recommendations on the standards throughout the review process?
- Can you suggest changes in the process and/or changes to the format and contents of key documents that would help to make these distinctions clearer?

Identifying, characterizing, quantifying, and communicating uncertainties in scientific information

- Recognizing the importance of characterizing and clearly communicating the uncertainties in the science and quantifying uncertainties in exposure and risk estimates as explicitly as possible, what are your views on any changes in the process and/or changes to the format and content of key documents that might facilitate a more complete, quantitative, and policy-relevant characterization of uncertainties?

LIST OF STAKEHOLDER MEETINGS AND PARTICIPANTS

Meeting with Industry Representatives, February 23, 2006

American Petroleum Institute	Lyle Isenkower
Electric Power Research Institute	Ron Wyzga
Automobile Alliance	Valerie Ughetta
Hunton & Williams	Cindy Langworthy

Meeting with State Stakeholders, March 3, 2006

NESCAUM (Northeast States)	Arthur Marin and Phil Johnson
California Air Resources Board	Lynn Terry and Richard Bode

Meeting with Environmental/Public Health Stakeholders, March 3, 2006

American Lung Association	Paul Billings, Janice Nolan, Debbie Shprentz, Blake Early
Environmental Defense	Vickie Patton, John Balbus
Clean Air Trust	Frank O'Donnell
Earthjustice	Howard Fox
Nat'l Park Conservation Foundation	Mark Wenzler

Meeting with NAS Chairs, March 6, 2006

Health Effects Institute	Dan Greenbaum, Bob O'Keefe
Johns Hopkins	Jon Samet

In addition to these planned stakeholder discussions, this topic has arisen in numerous other meetings and events. For example, I spoke at a meeting of the Agricultural Air Quality Task Force on March 1, 2006. I made brief remarks about this issue and fielded questions. More of these meetings and events were scheduled for the purpose of discussing this issue. And the issue has generally been addressed in an informational manner. I have not attempted to list all such events, but am happy to provide additional information if desired.

Question 30. As follow up to the November 10, 2005 Subcommittee hearing regarding the Implementation of the Existing Particulate Matter and Ozone Air Quality Standards, you were asked about the EPA's Equipment Replacement Rule in the context of the memorandum from Deputy Administrator Peacock regarding enforcement of New Source Review requirements. You responded:

"The regulated community must comply with all applicable regulations, including existing NSR requirements. As your question points out, the Agency's Equipment Replacement Rule (ERP) has been stayed by the U.S. Court of Appeals for the District of Columbia Circuit, and therefore the regulated community currently has no legal right to rely on ERP to avoid potential NSR liability. The 'Peacock Memorandum' was not intended to circumvent the D.C. Circuit stay or 'legaliz[e] questionable activity.' Indeed, the Agency reserves its discretion to bring enforcement actions against companies that violate the law, including those that prematurely rely on ERP. EPA's enforcement resources are limited, and thus the Agency must expend its resources wisely. The Peacock Memorandum does not create any rights for the regulated community and is intended to help focus EPA's enforcement discretion on those cases that would have the biggest benefit for human health and the environment."

NSR cases have been shown to have very large benefits. The EPA Office of Enforcement recently briefed EPA on its enforcement activities during the last year and noted that enforcement cases brought to conclusion during fiscal year 2005 resulted in 1.1 billion lbs. of pollutant reduction from all media. Of these reductions, nearly half the reductions, in the vicinity of half a billion pounds, were from 2 NSR enforcement cases (the Illinois Power/Dynegy case and the Ohio Edison case. These benefits only take into account a single year of reductions, with the actual reductions going on for many years into the future. These two cases represent the vast majority of benefits from the top ten air cases, which had estimated benefits for a single year valued at \$4.6 billion. With regard to your response quoted above, are there other cases that would have larger benefits than NSR cases? If so please identify in generic terms the types of cases that would have such benefits. Why would the particular cases identified in the Peacock NSR memorandum be lacking in large benefits?

Response. The October 13, 2005 memorandum stated that as part of EPA's NSR national priority, the Agency will continue to pursue filed cases and cases in active negotiation against coal-fired power plants. In deciding the additional cases to pursue, EPA will focus resources on those matters that violate the "NSR reform rules" and EPA's latest NSR utility proposal.

Emissions from the electric utility sector are also projected to decrease dramatically over the next two decades as a result of several CAA programs, including the Clean Air Interstate Rule, the Acid Rain Program, and the Clean Air Visibility rule. We describe the EGU emission reductions from these regulations in detail at 70 Fed. Reg. 61,084 (Oct. 20, 2005). EPA will present supporting analyses in our supplemental proposal when published.

The emissions reductions from the electric utility sector that will occur as a result of the enforcement cases and CAA programs mentioned above will allow the Agency to focus its limited enforcement resources to pursue NSR violations in other industrial sectors that are known to have significant emission inventories. Focusing on these sectors has the potential to produce significant human health and environmental benefits. The following data is taken from EPA's 2002 National Emission Inventory (NEI) Data base, and identifies the top twenty-four industrial sectors in the NEI, excluding utilities:

Sector	Nationwide SO ₂ Emissions Point Sources (tpy)
Pulp and Paper Mills	448,385
Petroleum Refining	404,154
Combination Utilities	331,858
Oil and Gas	185,000
Cement Manufacturing	183,599
Food and Kindred Products	153,223
Organic Chemical Production	133,995
Primary Smelting of Nonferrous Metals	132,898
Inorganic Chemical Production	119,992
Primary Production of Aluminum	117,548
Misc. Chemical Products	108,322
Coke Ovens and Steel Works	98,651
Misc. Petroleum and Coal Products	75,106
Agricultural Chemicals Production	73,457
Service Industries	62,865
Plastics Materials and Synthetic Resins	61,688
Aluminum Products	32,783
Instruments and Related Products	28,183
Concrete Products	28,104
Metal Mining	23,398
Glass Products	23,277
Misc. Mineral Products	22,436
Public Administration	21,731
Steam and Air-Conditioning Supply	21,229

Sector	Nationwide NO _x Emissions Point Sources (tpy)
Natural Gas Production, Transmission, and Distribution	575,515
Oil and Gas Production	318,210
Pulp and Paper Mills	302,657
Petroleum Refining	242,648
Cement Manufacturing	231,674
Organic Chemical Production	188,052
Combination Utilities	146,421
Coke Ovens and Steel Works	107,213
Glass Products	82,978
Food and Kindred Products	82,115
Lumber and Wood Products	62,146
Inorganic Chemical Production	58,681
Metal Mining	58,472
Refuse Systems	53,283
Agricultural Chemicals Production	51,489
Plastics Materials and Synthetic Resins	50,187
Service Industries	43,163
Concrete Products	34,084

Sector	Nationwide NO _x Emissions Point Sources (tpy)
Public Administration	28,891
Transportation Equipment	22,342
Primary Production of Aluminum	21,891
Misc. Chemical Products	19,174
Misc. Mineral Products	18,795
Textile Mill Products	18,635

Question 31. You were also asked whether the Illinois Power/Dynegy and Ohio Edison would have been eligible for filing under the Peacock memo? You responded: “[b]oth Illinois Power and Ohio Edison are filed cases and were prosecuted to successful settlements. It is EPA’s long-standing policy to not comment on specific enforcement sensitive aspects of individual cases.” Since those cases are now settled, would it violate any specific enforcement privilege to indicate whether or not the application of the Peacock memorandum would have resulted in a different outcome in those cases? How? If not, please indicate, by way of yes or no answers, whether such cases would have been impacted by the Peacock memorandum and whether the Agency would have brought them if the Peacock memorandum were in effect.

Response. The Agency is unable to comment on specific matters, even if prosecuted to successful settlements, because any such comments could be used to affect ongoing litigation. As discussed above, it is EPA’s long-standing policy not to comment on the specific enforcement-sensitive aspects of the enforcement cases; that a matter is settled or closed does not cause an otherwise applicable common law or statutorily based privilege to no longer apply to a matter. Any assessment performed by attorneys or at the direction of EPA’s attorneys regarding the impact that a newly promulgated or proposed rule might or might not have on settled or pending cases would be protected from disclosure by application of the attorney-client privilege or attorney work product doctrine. EPA has a number of cases in active litigation at this time, and there are many common issues of fact and law between these cases and those that are pending or resolved. Thus, disclosure of an EPA assessment of whether or not the Peacock memorandum would have dictated a different outcome in the Illinois Power/Dynegy and Ohio Edison matters is privileged.

Question 32. You were also asked whether the proposed NSR rule was similar to a previous EPA NSR proposal that was previously rejected by EPA (as recently as 2002) because it could lead to large emissions increases without requiring controls. You responded by contending that the previous approach rejected by EPA (CMA Exhibit B) was not the same as the proposed rule because the proposed rule determines actual emissions based on current operating capacity, which is not the same as the approach in CMA Exhibit B. Furthermore, CMA Exhibit B proposed to use potential emissions to determine the amount of emissions that must be offset. We proposed to retain actual emissions for computing the amount or availability of emissions offsets. For these reasons, the maximum achievable hourly emissions option of our proposed rule for EGUs is not the same approach as CMA Exhibit B.

In essence, your contention is that the proposed approach is not a potential-to-potential test, but is an actuals based test and therefore would not lead to the same emissions increases as a potential-to-potential test. However, the assertion that the proposed rule is not a potential-to-potential test is not supported or explained. In fact, however, the Agency has previously described the proposed rule as a potential-to-potential test. In a June 25, 2005 draft of the proposal informally submitted to the Office of Management and Budget. See EPA-HQ-OAR-2005-0163-0044, at 71 EPA stated that we believe the potential-to-potential test as proposed in the form of a maximum hourly emissions test considering controls for CAIR Units is particularly well suited for striking the required balance between effective environmental protection at a cost that is not detrimental to economic growth.(emphasis added); id. at 68-69 (We do not believe that a potential-to-potential approach is acceptable for major NSR applicability as a general matter. Nonetheless, we believe that in circumstances where use of highly efficient units ensure air quality, such as those for CAIR Units, a potential-to-potential approach would be acceptable.) (emphasis added). The Agency has also admitted that a potential to potential test will lead to large emission increases and stated that We agree that a potential-to-potential test for major NSR applicability could lead to unreviewed increases in emissions that would be detrimental to air quality and could make it difficult to implement the statutory requirements for state-of-the-art controls. 67 Fed. Reg. at 80,205/2. at 80,205/3.

In light of all of the elements of CMA exhibit B that lead to the previous EPA criticisms in 1996 and 2002, please explain how the proposed rule has eliminated all of those elements in such a way that now allows EPA to claim the proposal would not result in harmful emissions consequences. Please indicate whether the proposal would require controls in all instances that CMA exhibit B would not have required control. If the proposal does not require controls in situations where sources do not exceed their potential emissions, please describe such situations. Please explain why the harms arising from these situations are not equally true under the proposed rule when compared to CMA Exhibit B.

Response. As you point out, in early versions of the preamble for our proposal, we described our test as “the potential-to-potential test as proposed in the form of a maximum hourly emissions test.” However, this description was a mischaracterization that was corrected in subsequent preambles. It is not uncommon for errors to occur in draft documents that the Agency prepares for review prior to publication.

With respect to emissions, we believe that the difference in outcome between the maximum hourly test as EPA has proposed and the annual emissions test, under current Clean Air Act constraints, would be significantly less than the difference in outcome between the CMA Exhibit B potential-to-potential test and the annual emissions test, under the Clean Air Act constraints that existed in 1988, when EPA conducted the CMA Exhibit B analysis. This difference arises because under the various programs of the 1990 Clean Air Act Amendments (for example, the Clean Air Interstate Rule, Clean Air Visibility Rule, NO_x SIP Call, Acid Rain program), actual annual emissions for EGU have been significantly constrained. By comparison, before the 1990 Clean Air Act Amendments, revising those modification rules in CMA Exhibit B could have had a much greater impact on emissions and air quality. Moreover, in CMA Exhibit B, the allowable emission rates of course did not reflect the additional requirements under the Clean Air Act that came into effect for EGUs after 1990. For this reason, an analysis of the difference in outcomes undertaken today would be unlikely to have the same results as the CMA Exhibit B analysis completed in 1988. Public commenters have asked us to address this question, and we intend to respond to it as part of our response to the public comments for the proposed rulemaking.

Concerning when controls might be required under the existing major NSR program, it is speculation to attempt to determine when any single facility would undergo a physical change or change in the method of operation. Should a facility undertake a physical change or change in the method of operation, it may be the case that the facility would not trigger major NSR review under the actual-to-projected-actual emissions test in the current rules. This is because facility actual annual emissions within the prior 5-year period vary such that there frequently is a 2-year period with higher baseline actual emissions than the facility’s emissions at the time of the change and higher than the facility’s projected actual emissions.

There is an additional reason that limits the difference in outcome between the proposed maximum hourly emissions test and the actual-to-projected-actual emissions test. Like the NSPS test, the major NSR regulations allow for consideration of an emission unit’s operating capacity in determining whether a change results in an emissions increase. Under the actual-to-projected-actual test, a source can subtract from its post-project emissions those emissions that the unit could have accommodated during the baseline period and that are unrelated to the change (sometimes referred to as the “demand growth exclusion”). That is, the source can emit up to its current maximum capacity without triggering major NSR under the actual-to-projected-actual test, as long as the increase is unrelated to the physical or operational change. We plan to address this point in more detail in our response to comments on our proposed rulemaking.

There are further differences between the maximum hourly test that we have proposed and the CMA Exhibit B test. The CMA Exhibit B test is a true “potential-to-potential” test because it compares pre-change emissions at design capacity to post-change emissions at design capacity. Our criticisms in 1996 and 2002 concerned the CMA Exhibit B potential-to-potential emissions increase test. The test in our proposed rulemaking in 70 FR 61081 (October 20, 2005), is based on the pre- and post-change actual physical and operating capacity in light of our view that EGUs generally operate, for at least a short period, at their actual physical and operating capacity. See 70 FR at 61091/1–2. Therefore, our proposed test is a test of actual emission increases based on actual physical and operating capacity, and not a potential-to-potential test.

If an EGU increases its actual operating capacity over the maximum actual operating capacity in the past 5 years, it would require major NSR review under the proposed maximum hourly emissions test. This is not the case with the potential-

to-potential test in CMA Exhibit B. In the potential-to-potential test, major NSR review would only occur if an emissions unit increased its design capacity. Major NSR review, and resulting control technology determinations, are thus more likely to occur under the proposed maximum hourly emissions test than under the potential-to-potential emissions test in CMA Exhibit B.

For all these reasons, our proposed test is distinct from a potential-to-potential test like CMA Exhibit B, and we believe it is accurate to conclude that it will not result in harmful emissions consequences.

Question 33. Another question you were asked as follow up to the November 10, 2005 relates to EPAs recently proposed NSR rule and whether it would lead to emissions increases. You responded: We do not expect the proposed rule would lead to emission increases from the power sector. To the contrary, emissions from the power sector are projected to decrease dramatically over the next two decades. This is attributable to several CAA programs, including the Clean Air Interstate Rule, the Acid Rain Program, and the Clean Air Visibility rule. The question you were asked, however, was not intended to address whether emissions from the power sector as a whole will decline over time due to other programs, but whether the proposed NSR exemption (or method of calculating increases) allows additional pollutants to be emitted in comparison to EPAs current NSR regulatory approach? If so, has EPA calculated in any way the amount of these emissions and will EPA provide this calculation to the committee?

Response. Power sector SO₂ and NO_x emissions will continue to decline over time, regardless of whether the major NSR emissions increase test is the actual-to-projected-actual emissions test or the maximum achievable hourly emissions test. For the reasons we state in the answer to number 30 above, we do not believe that the revised emissions test would result in a substantially different outcome from the actual-to-projected-actual test. We are aware of the interest in more analysis of the environmental impacts of our proposal. As we indicated in our 2005 notice, we plan to provide additional environmental analysis in our supplemental notice, which we expect to publish this summer.

Question 34. With regard to the issue of emission increases that could occur as a result of the proposed NSR rule, you were asked about an EPA memorandum from Adam Kushner that did estimate large increases from the proposed rule. You were asked: What is the Agency's position with regard to these case studies? Does the Agency believe that its proposed changes will not allow such increases in emissions? On what basis does the Agency reach such a conclusion? You answered as previously noted, we intend to provide in the near future a thorough environmental analysis of the NSR proposal in a supplemental proposal. Please answer these specific questions.

Response. We intend to respond to the analyses in Adam Kushner's memorandum as part of our response to the public comments for the proposed rulemaking. As we indicated in our 2005 notice, we plan to provide additional environmental analysis in our supplemental notice, which we expect to publish this summer.

Question 35. In relation to the NSR rule signed on December 13, 2005, you were asked: (With respect to the proposed new source review rule that was signed on October 13, 2005, please produce all documents (including electronic documents and e-mails) in the Agency's possession related to the proposed rule, that were prepared or dated prior to October 13, 2005, including but not limited to:

- A. drafts of the preamble or inserts for the preamble;
- B. comments on draft rules or preambles;
- C. documents discussing the legislative history or legal authority related to this proposal; and
- D. correspondence or other documents related to the proposed rule that were shown to, given to, or received from people other than Federal employees or contractors.

Your response to the committee was to state that: (In response to your request for information on the NSR rule, we have included all non-privileged documents available at this time.) Please provide a list of the privileged documents and identify the privilege.

Response. You also requested a list of the privileged documents responsive to your previous request. I would be happy to speak with you or your staff about ways that we may be able to fulfill this request.

RESPONSES BY WILLIAM WEHRUM TO ADDITIONAL QUESTIONS FROM
SENATOR VOINOVICH

Question 1. You stated that clean air regulations affect the demand for natural gas but that it is not a substantial factor in the pricing of natural gas. However, EIA's testimony states that "very small shifts in either demand or supply can have a big impact on price." If clean air regulations affect the demand for natural gas, then based on EIA's statement haven't they in the past and won't they in the future impact the price of natural gas?

Response. Many different provisions of the Clean Air Act may affect both the construction and operation of electric generating units (EGUs) and may influence fuel choices by the power industry. Electric generating units may be considered to be major sources subject to Title V permitting requirements. In general, it is easier to obtain permits for new gas-fired plants than coal-fired plants. The cost of pollution control equipment to meet Best Available Control Technology requirements for coal-fired EGUs also greatly exceeds the cost of such equipment for gas-fired units. Other provisions of the Clean Air Act that do not directly regulate EGUs, including State implementation of the National Ambient Air Quality Standards, may also have an additional impact on fuel choices in particular States or regions.

EPA has not retrospectively analyzed the impact of all Clean Air Act programs, many of which are implemented on the State level, on fuel choices in the EGU sector and other industrial sectors which are large energy consumers. Therefore, the Agency cannot provide a comprehensive, quantitative assessment of the impact the implementation of all Clean Air Act programs on the price of natural gas. As I stated in my testimony, EPA has not seen evidence that regulations of the power sector are alone a substantial factor in the pricing of natural gas although it is certainly an important consideration in many decisions.

With respect to future impact, EPA has recognized that different approaches to regulation have the potential to affect both fuel choices and fuel prices in the EGU sector. As a result, the Agency has taken steps to design programs to avoid such an outcome. The recently promulgated Clean Air Interstate Rule, Clean Air Mercury Rule, and Clean Air Visibility Rule are examples of this. EPA's modeling shows that this suite of regulations will have minimal impacts on energy use patterns and natural gas prices. They are projected to increase natural gas prices only in the range of 1-3 percent between 2007 and 2020.

Question 2. You indicate that Clean Air Act programs can affect natural gas use. Several programs such as the NOx SIP call and Acid Rain program caused at least some fuel switching to natural gas. Other statistics indicate an 8 percent shift from coal to gas from 1998 to 2002. Is there danger of death from a thousand cuts — that small effects can add up to a much larger effect under the right circumstances?

Response. EPA believes that Clean Air Act programs can have an effect on the demand for natural gas and its price, but it has not determined that over time there has been a substantial impact on price. CAA programs do not appear to cause substantial shifts in natural gas usage. In the time period mentioned in your question, both coal and natural generation increased in real terms, although there was a much more rapid increase in gas-fired generation. This resulted in a decline in coal generation as a percent of total generation and an increase in natural gas generation as a percentage of total generation over that time period.

As mentioned with respect to question immediately preceding this question, EPA has taken care to design its suite of major Clean Air Act rules to avoid major impacts on energy usage and natural gas prices. Your question points to the need to ensure that future implementation of the Clean Air Act also take such impacts into account.

Question 3. A substantial amount of new natural gas plants were built since 1990 with a much smaller amount of coal. This trend is expected to continue at least through 2007. Aside from any cause and effect with regard to the Clean Air Act, doesn't this lopsided trend in of itself cause some concern? Even though many of these natural gas units may not run much now, they are built and could be subject to greater utilization in the future. How can we restore balance in new capacity?

Response. As detailed in question No. 5 below, a significant number of gas plants were built in the 1990's. From 1990 to 2003 a total of 115, 086 MW of combined cycle gas and 86,643 MW of gas turbine capacity was built, compared with only 11, 411 MW of coal steam capacity. Natural gas consumption for generation also increased during this time. EPA projections examining both a "base case" and the effect of CAIR/CAMR/CAVR also indicate that natural gas generation will increase relative to coal generation between 2010 and 2020.

EIA projects, however, that a significant amount of the new plants to be built over the next 10 to 15 years will be coal-fired. Longer term EPA projections for coal generation in the 2020–2030 timeframe also show increased coal utilization relative to natural gas. Therefore, increased construction of coal-fired capacity in the near to mid-term as well as policies such as CAIR/CAMR/CAVR which are attentive to their effect on energy usage can assist in maintaining balanced energy generation. However, market factors such as costs of natural gas, capital cost, and time required to build a gas plant compared to a coal plant are likely to have a greater impact on choice of fuel for new electric power generation.

Question 4. EPA has attempted to design programs to preserve fuel options in this country. I know that the Agency believes that the Clean Air Interstate, Mercury, and Visibility Rules have a limited effect on natural gas. Can you give us some indication of what might happen if the programs were not designed this way—for example, accelerating control requirements too much or removing flexible implementation methods?

Response. EPA's October 2005 Clear Skies analysis revealed that policies requiring emission reductions beyond what are feasible, particularly in the shorter term, are likely to lead to increased pressure on natural gas markets and prices. For example, the Clean Power Act and Clean Air Planning Act are anticipated to result in shifts to natural gas as a control option. In the case of the Clean Air Planning Act, EPA projected a 3–17 percent increase in natural gas prices between 2010 and 2020. This case indicates that more stringent standards and less flexible mechanisms can affect natural gas prices (and consumption).

Question 5. Please provide data on fuel choices for utilities which have been brought on line since the 1990 Clean Air Act Amendments (list numbers of power plants each year since 1990 and their fuel choices).

Response. The following table provides the requested information:

New Capacity Additions between 1990 and 2003

	New Capacity (MW)			# of Units		
	Combined			Combined		
	Coal Steam	Cycle	Turbine	Coal Steam	Cycle	Turbine
1990	1,982	3,097	1,626	18	60	172
1991	3,265	2,246	1,511	11	35	75
1992	1,148	2,893	2,114	11	51	91
1993	568	3,012	1,300	4	62	98
1994	382	5,625	2,243	3	72	89
1995	2,194	1,654	3,393	12	21	87
1996	1,092	1,812	1,800	4	29	95
1997	0	1,622	1,293	0	21	84
1998	0	1,347	1,210	0	13	100
1999	260	2,511	6,250	3	25	149
2000	0	11,687	14,564	0	84	287
2001	0	12,890	19,564	0	85	387
2002	440	32,755	19,705	1	69	139
2003	80	31,936	10,071	1	63	70
	11,411	115,086	86,643	68	690	1,923

Source: EPA's NEEDS 2004

Note: This data (additions) is based upon online year.

Question 6. Please provide permitting information for coal versus natural gas plants.

Response. Although permit limits for coal and gas-fired plants have changed over time, and have decreased considerably for coal plants, current permit emission rates are generally characterized in the following table:

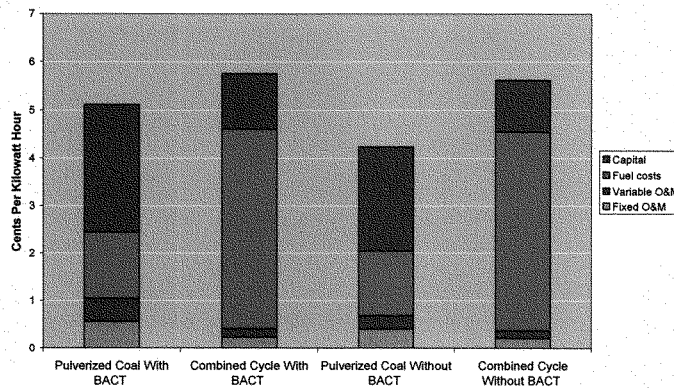
Pollutant	Pulverized Coal Plant	Combined Cycle (Gas) Plant
Sulfur (% removal)	98	Negligible SO ₂ emission
NOx (lb/MMBtu)	0.06	0.007
Particulate Matter (lb/MMBtu)	0.012	Negligible PM emission
Hg (% removal)	90	No Hg emission

Question 7. Please provide the cost and typical controls for a new coal power plant compared to a new gas plant.
 Response. See below.

New Plant Cost (cent/Kwh)

1995		2008	
Plant Type	cents/Kwh	Plant type	cents/Kwh
PC Plant with BACT Controls	3.98	PC Plant with BACT Controls	5.11
PC Plant with out BACT Controls	3.25	PC Plant with out BACT Controls	4.24
Combined Cycle with BACT controls	2.96	Combined Cycle with BACT controls	5.76
Combined Cycle without BACT controls	2.86	Combined Cycle without BACT controls	5.62

Figure 6 Comparison of the Electric Generation Costs for New Pulverized Coal and Natural Gas Combined-Cycle Units in 2008



RESPONSES BY WILLIAM WEHRUM TO ADDITIONAL QUESTIONS FROM
SENATOR LIEBERMAN

Question 1. Please state in absolute terms the extent to which coal-fired power plant capacity was increased after November 15, 1990. Please state in absolute terms to the extent to which natural gas-fired power plant capacity was increased after November 15, 1990.

Response. The following table provides the requested information:

New Capacity Additions between 1990 and 2003

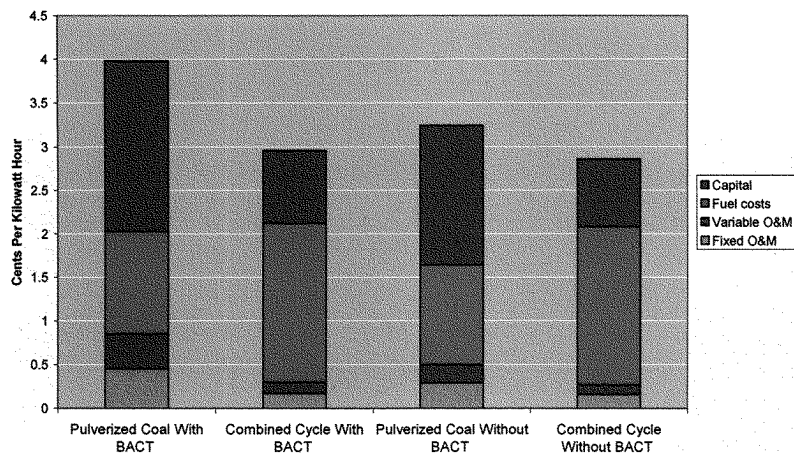
	New Capacity (MW)			# of Units		
	Combined			Combined		
	Coal Steam	Cycle	Turbine	Coal Steam	Cycle	Turbine
1990	1,982	3,097	1,626	18	60	172
1991	3,265	2,246	1,511	11	35	75
1992	1,148	2,893	2,114	11	51	91
1993	568	3,012	1,300	4	62	98
1994	382	5,625	2,243	3	72	89
1995	2,194	1,654	3,393	12	21	87
1996	1,092	1,812	1,800	4	29	95
1997	0	1,622	1,293	0	21	84
1998	0	1,347	1,210	0	13	100
1999	260	2,511	6,250	3	25	149
2000	0	11,687	14,564	0	84	287
2001	0	12,890	19,564	0	85	387
2002	440	32,755	19,705	1	69	139
2003	80	31,936	10,071	1	63	70
	11,411	115,086	86,643	68	690	1,923

Source: EPA's NEEDS 2004

Question 2. Please assess the impact of the following factors on natural gas demand since 1990: the cost of natural gas, capital costs for new natural gas plants, opportunities for siting such plants, the time required to build such plants, and responsiveness to load changes of gas-fired power plants. Please compare or contrast the effect of the requirements of the Clean Air Act and EPA's implementation thereof to or with the factors enumerated in the previous sentence in terms of their impact on natural gas demand.

Response. EPA believes that the primary factors that have lead to increased use in natural gas in the power sector are the low costs of natural gas throughout the 1990's and the lower capital cost and time required to build a gas plant compared to a coal plant. EPA has not seen evidence that its regulations of the power sector are a substantial factor in the pricing of natural gas. The figure below details the relative costs of coal and natural gas plants during the 1990's.

Figure 3 Comparative Costs of New Pulverized Coal and Combined-Cycle Natural Gas Units in Mid-1990s



Note: The costs for new plants and fuels are based on various reports issued by Department of Energy and Energy Information Administration. The plant costs have been adjusted for the plant size and the year of operation, using the GDP implicit price deflator reported by Department of Commerce. The delivered cost for natural gas in this analysis is \$2.70/MMBTU and the delivered cost for coal is \$1.26/MMBTU. The costs of environmental controls are based on EPA's Integrated Planning Model.

Question 3. Throughout the 1990's a number of States, as well as the Federal Energy Regulatory Commission, restructured electricity ratemaking or deregulated it. Please describe the impact of electricity restructuring or deregulation on the building of new natural gas power plants and the demand for natural gas.

Response. EPA has not done any significant analysis of the impact of electricity restructuring or deregulation on the building of new natural gas power plants and the demand for natural gas. According to the National Petroleum Council, "in a deregulated environment, electricity generators seek the shortest possible time between the decision to build and point at which capital costs are recovered. Gas-fired plants have the shortest construction time."¹

STATEMENT OF ARTHUR E. SMITH, JR., SENIOR VICE PRESIDENT AND ENVIRONMENTAL COUNSEL, NiSOURCE, INC. ON BEHALF OF THE AMERICAN GAS ASSOCIATION

INTRODUCTION

Thank you for the opportunity to testify before the subcommittee. My name is Arthur E. Smith, Jr. and I am the Senior Vice President and Environmental Counsel at NiSource Inc. NiSource is headquartered in Merrillville, Indiana and we are engaged in virtually all phases of the natural gas and electricity businesses, serving 3.7 million customers from the Gulf Coast through the Midwest and New England. I am testifying today on behalf of the American Gas Association which represents 197 local energy utility companies that deliver natural gas to more than 56 million homes, businesses and industries throughout the United States. Natural gas meets one-fourth of the United States' energy needs and it is the fastest growing major energy source. As a result, adequate supplies of competitively priced natural gas are of critical importance to AGA and its member companies. Similarly, ample supplies of reasonably priced natural gas are of critical importance to the millions of consumers that AGA members serve. AGA speaks for those consumers as well as its member companies.

The natural gas industry is at a critical crossroads. Natural gas prices were relatively low and very stable for most of the 1980's and 1990's. Wholesale natural gas prices during this period tended to fluctuate around \$2 per million Btus (MMBtu).

¹National Petroleum Council, Natural Gas Meeting the Challenges of the Nation's Growing Natural Gas Demand, Volume II Task Group Reports, December 1999.

But the balance between supply and demand has been extremely tight since then, and even small changes in weather, economic activity or world energy trends have resulted in significant wholesale natural gas price fluctuations. Market conditions have changed significantly since the winter of 2000–2001. Today our industry no longer enjoys prodigious supply; rather, it treads a supply tightrope, bringing with it unpleasant and undesirable economic and political consequences most importantly high prices and higher price volatility. Both consequences strain natural gas customers residential, commercial, industrial and electricity generators.

As this subcommittee well knows, energy is the lifeblood of our economy. More than 65 million Americans rely upon natural gas to heat their homes, and high prices are a serious drain on their pocketbooks. High, volatile natural gas prices also put America at a competitive disadvantage, cause plant closings, and idle workers. Directly or indirectly, natural gas is critical to every American.

The consensus of forecasters is that natural gas demand will increase steadily over the next two decades. This demand growth will be driven by the electricity generation market, as natural gas has been the fuel of choice for over 90 percent of the new generation units constructed over roughly the past decade. In part, the dominance of natural gas in this market is attributable to environmental regulations that promote the clean-burning characteristics of natural gas. The overall growth in gas usage will occur because natural gas is the most environmentally friendly fossil fuel and is an economic, reliable, and homegrown source of energy. It is in the national interest that natural gas be available to serve the demands of the market. The Federal Government must address these issues and take prompt and appropriate steps to ensure that the Nation has adequate supplies of natural gas at reasonable prices.

EXECUTIVE SUMMARY

- Natural gas markets have been extremely tight for the past 5 years, with supply unable to keep pace with rising demand. New supply initiatives are crucial to correcting this imbalance, but demand side actions are also necessary, particularly with regard to the use of natural gas for electricity generation.
- Natural gas demand is projected to increase by 37 percent over the next 15 years, with over 70 percent of this increase attributable to electricity generation.
- Natural gas has been the fuel of choice for over 90 percent of the newly constructed generating units over the past decade. This dominance results from a number of factors, including the environmental attributes of gas that lead to lower capital costs and shorter construction lead times relative to other generating options.
- Public policymakers must consider both energy and environmental goals when developing regulations that impact electricity generation. That is, environmental goals must be achieved in concert with the pursuit of a greater diversity in the electricity generation mix.
- The construction of new generating units utilizing clean, highly efficient new technologies will be most successful in meeting dual energy and environmental goals. That is, technologies such as integrated gasification combined cycle (IGCC), nuclear energy, solar, wind and gas-based combined heat and power systems. These technologies must be actively encouraged and promoted.

NATURAL GAS MARKET CONDITIONS

Stability in the natural gas marketplace is crucial to all of America for a number of reasons. It is imperative that the natural gas industry and the government work together to take significant action in the very near term to assure the continued economic growth, environmental protection, and national security of our Nation. The tumultuous events in energy markets over the last several years serve to underscore the importance of adequate and reliable supplies of reasonably priced natural gas to consumers, to the economy, and to national security.

There has been a crescendo of public policy discussion with regard to natural gas markets since the “Perfect Storm”⁵ winter of 2000–2001, when tight supplies of natural gas collided with record-cold weather to yield record natural gas home-heating bills. The vulnerability of the natural gas market to weather was demonstrated again in the summer of 2005 when weather that was 18 percent warmer than normal pushed more gas into electricity generators to meet air conditioning demand, and yet again in September when multiple hurricanes in the Gulf of Mexico eliminated nearly 25 percent of our total gas supply. The hot summer pushed natural gas prices upward from the \$6 per MMBtu level to roughly \$8, the hurricanes resulted in prices that fluctuated between \$12 and \$14 per MMBtu, and a brief cold snap in December produced a price spike to roughly \$15 per MMBtu. Clearly, nat-

ural gas markets are higher and more volatile than at any point in history. Moreover, there is no sign that this market volatility will abate in the near future.

It is harmful to individual families and to the entire U.S. economy for natural gas prices to remain both high and volatile. Unless we make the proper public policy choices—and quickly—we will be facing many more difficult years with regard to natural gas prices. Of course, when families pay hundreds of dollars more to heat their homes, they have hundreds of dollars less to spend on other things. Many families are forced to make difficult decisions between paying the gas bill, buying a new car, or saving for future college educations. There are, of course, State and Federal programs such as LIHEAP to assist the most needy. But LIHEAP only provides assistance to about 15 percent of those who are eligible, and it does not provide assistance to the average working family. These price increases have affected all families those on fixed incomes, the working poor, lower-income groups, those living day to day, and those living comfortably.

The impact of unstable natural gas markets on U.S. businesses is equally disturbing. Since natural gas prices began rising in 2000, an estimated 78,000 jobs have been lost in the U.S. chemical industry, which is the Nation's largest industrial consumer of natural gas, both for the generation of electricity at manufacturing plants and as a raw material for making medicine, plastics, fertilizer and other products used each day. Similarly, fertilizer plants, where natural gas can represent 80 percent of the cost structure, have closed one facility after another. Glass manufacturers, which also use large amounts of natural gas, have reported earnings falling by 50 percent as a result of natural gas prices. In our industrial and commercial sector, competitiveness in world markets and jobs at home are on the line.

NATURAL GAS DEMAND GROWTH AND ELECTRICITY GENERATION

In a study prepared for the American Gas Foundation in February 2005, natural gas demand is projected to increase by 37 percent between 2003 and 2020 under a "most likely" energy scenario. Although higher natural gas prices may moderate some of this projected demand growth, including the growth in demand for gas-fired electricity generation, we believe the fundamentals of this document remain sound and the basic tenets are unchanged. Some of the findings of this report are summarized below.

About 4.2 quads of gas were consumed to generate electricity in 2003, 19 percent of total U.S. gas consumption. This market share is projected to increase to 27 percent by 2010 (6.8 quads) and to 33 percent (10.2 quads) by 2020. Thus, by 2020 electricity generators are expected to be the dominant sector in terms of gas demand, with consumption 32 percent greater than that of the industrial sector and 61 percent greater than that of the residential sector.

Today, natural gas is the source of about 18 percent of all electricity generated but this number is projected to increase to 26 percent by 2020. Conversely, 55 percent of all electricity generated today is coal-based but this percentage is projected to fall to 50 percent by the end of the forecast period.

Electricity generators have been choosing natural gas as a fuel source in recent years for a number of reasons—low capital cost, the ability to construct in a modular fashion, economical construction even for relatively small plants, ease of permitting and short construction lead times. In addition, natural gas is an environmentally preferable fuel. When compared to other options, gas offers benefits on a number of environmental fronts—acid rain, urban smog, visibility, mercury emissions, water consumption and solid waste production. Much of the natural gas-based generating capacity added did not face the environmental uncertainties associated with larger coal-based generation facilities. While natural gas usage for electricity generation is not required by environmental regulation, the environmental characteristics of gas combustion made permitting less complex in adding incremental electricity generating capacity. For example, pollution control equipment is often minimal or not required at all, thus capital costs and construction lead times are both reduced. Because natural gas combustion also emits significantly less carbon than coal or oil combustion, the gas-fired facilities added did not even have the level of "climate risk" associated with the other fuels as a result of their greenhouse gas emissions.

To date, energy and environmental regulations regarding electricity generating units have not been developed in a unified and consistent fashion. Public policy must seek to diversify the fuel sources used to generate electricity, thereby reducing upward price pressure on natural gas markets, while also reducing the environmental impacts of electricity generation. These dual goals will most likely be met through the construction of new and highly efficient generating technologies. For example, new coal-based IGCC (integrated gasification combined cycle) units, nuclear

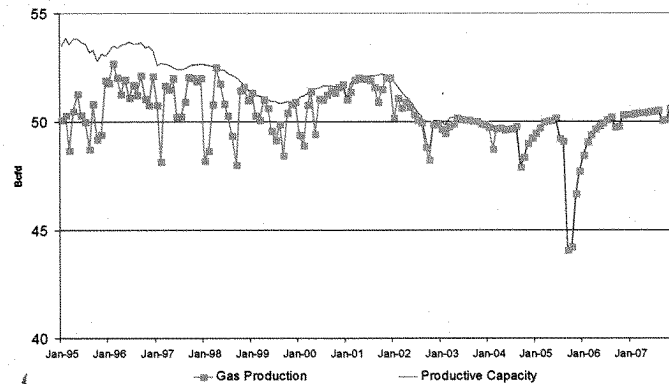
units, solar and wind-powered units, and natural gas-based CHP (combined heat and power) systems must play a role in the electricity generation future. Existing environmental policies often do not favor the construction of these new and novel generating options, rather they promote cleaning up existing sources that are often used in combination with low efficiency gas peaking turbines to meet increasing electricity demand.

NATURAL GAS SUPPLY

For the past 5 years, natural gas production has operated full-tilt to meet consumer demand. The “surplus deliverability” or “gas bubble” of the late 1980’s and 1990’s is simply gone, as illustrated in the graphic below that compare actual natural gas production with production capability (prepared by Energy and Environmental Analysis).

Lower-48 Dry Gas Production vs. Dry Gas Productive Capacity

Source: Energy and Environmental Analysis, Inc.



American Gas Association



No longer is demand met while unneeded production facilities sit idle. No longer can new demand be met by simply opening the valve a few turns. The valves have been, and presently are, wide open.

America has a large and diverse natural gas resource; producing it, however, can be a challenge. Providing the natural gas that the economy requires will necessitate: (1) providing incentives to bring the plentiful reserves of North American natural gas to production and, hence, to market; (2) making available for exploration and production the lands—particularly Federal lands—where natural gas is already known to exist so gas can be produced on an economic and timely basis; (3) ensuring that the new infrastructure that will be needed to serve the market is in place in a timely and economic fashion.

The estimated natural gas resource base in the United States has actually increased over the last several decades. In fact, we now believe that we have more natural gas resources in the United States than we estimated 20 years ago, notwithstanding the production of approximately 300 trillion cubic feet of gas in the interim. This is true, in part, because new sources of gas, such as coalbed methane, have become an important part of the resource base. Nonetheless, having the natural gas resource is not the same as making natural gas available to consumers. That requires natural gas production.

Natural gas production is sustained and grows only by drilling in currently productive areas or by exploring in new areas. Over the past two decades a number of technological revolutions have swept across the industry. We are able today to drill for gas with dramatically greater success and with a significantly reduced environmental impact than we were able to do 20 years ago. We are also much more efficient in producing the maximum amount of natural gas from a given area of

land. A host of technological advances allows producers to identify and extract natural gas deeper, smarter, and more efficiently. For example, the drilling success rate for wells deeper than 15,000 feet has improved from 53 percent in 1988 to over 82 percent today. In addition, gas trapped in coal seams, tight sands, or shale is no longer out of reach, and today it provides a major source of supply.

While further improvements in this regard can be expected, they will not be sufficient to meet growing demand unless they are coupled with other measures. Regrettably, technology alone cannot indefinitely extend the production life of mature producing areas. New areas and sources of gas will be necessary.

Notwithstanding the dramatic impact of innovation upon the natural gas business, the inevitable fact today is that we have reached a point of rapidly diminishing returns with many existing natural gas fields. This is almost entirely a product of the laws of petroleum geology. The first ten wells in a field may ultimately produce 60 percent of the gas in that field; yet it may take forty more wells to produce the balance. In many of the natural gas fields in America today, we are long past those first ten wells and are well into those forty wells in the field. In other words, the low-hanging fruit have already been picked in the orchards that are open for business.

Drilling activity in the United States has moved over time, from onshore Kansas, Oklahoma and Arkansas to offshore Texas and Louisiana, and then to the Rocky Mountains. Historically, we have been quite dependent on fields in the Gulf of Mexico. But recent production declines in the shallow waters of the Gulf of Mexico have necessitated migration of activity to deeper waters to offset this decline. These newer, more expensive, deepwater fields tend to have short lives and significantly more rapid rates of decline in production than onshore wells.

The sobering reality is that America's producers are drilling more wells today than they were 5 years ago. Nevertheless, domestic supply is struggling to be sustained. U.S. gas producers are on an accelerating treadmill, running harder just trying to stay in place. For reasons that are partly due to technology, and partly due to the maturing of the accessible natural gas resource base, a typical well drilled today will decline at a faster rate than a typical well drilled a decade ago. Moreover, because up to half of this country's current natural gas supply is coming from wells that have been drilled in the past 5 years, this decline trend is likely to continue.

Before we can meet growing gas demand, we must first replace the perennial decline in production. The U.S. natural gas decline rate will be in the range of 26–28 percent this year. In practical terms, if all drilling stopped today, in 12 months U.S. natural gas production would be 26–28 percent lower than it is today. The accelerating decline rate helps explain why U.S. gas deliverability has been stuck in the 52–54 billion cubic feet per day range for the past 8 years, notwithstanding an increase in gas-directed drilling.

In short, America's natural gas fields are mature—in fact many are well into their golden years. There is no new technology on the horizon that will permit us to pull a rabbit out of a hat in these fields. These simple and incontrovertible facts explain why we are today walking a supply tightrope. High and volatile natural gas prices have become the norm and will become increasingly accentuated as the economy returns to its full vigor. There is no question that high and volatile natural gas prices are putting a brake on the economy, once again causing lost output, idle productive capacity, and lost jobs.

If we are to continue to meet the energy demands of America and its citizens and if we are to meet the demands that will they make upon us in the next two decades, we must change course. It will not be enough to make a slight adjustment or to wait 3 or 4 more years to make necessary policy changes. Rather, we must change course entirely, and we must do it in the very near future. Lead times are long in our business, and meeting demand years down the road requires that we begin work today.

We have several reasonable and practical options. It is clear that continuing to do what we have been doing is simply not enough. In the longer term we have a number of options:

First, and most importantly, we must work to sustain and increase natural gas production by looking to new frontiers within the United States. Further growth in production from this resource base is jeopardized by limitations currently placed on access to it. For example, most of the gas resource base off the East and West Coasts of the United States and the Eastern Gulf of Mexico is currently closed to any exploration and production activity. Moreover, access to large portions of the Rocky Mountains is severely restricted. The potential for increased production of natural gas is severely constrained so long as these restrictions remain in place.

To be direct, America is not running out of natural gas, and it is not running out of places to look for natural gas. America is running out of places where we are allowed to look for gas. The truth that must be confronted now is that, as a matter

of policy, this country has chosen not to develop much of its natural gas resource base. We doubt that that many of the 65 million American households that depend on natural gas for heat are aware that this choice has been made on their behalf.

In this vein, the Rocky Mountain region is expected to be a growing supplier of natural gas, but only if access to key prospects is not unduly impeded by stipulations and restrictions. Two separate studies by the National Petroleum Council and the U.S. Department of the Interior reached a similar conclusion that nearly 40 percent of the gas resource base in the Rockies is restricted from development, in some cases partially and in some cases totally. On this issue, the Department of the Interior noted that there are nearly 1,000 different stipulations that can impede resource development on Federal lands.

One of the most significant new gas discoveries in North America in the past 10 years is located just north of the United States/Canada border in eastern Canadian coastal waters on the Scotian shelf. Natural gas discoveries have been made at Sable Island and Deep Panuke. Gas production from Sable Island already serves Canada's Maritimes Provinces and New England through an offshore and land-based pipeline system. This has been done with positive economic benefits to the region and without environmental degradation. This experience provides an important example for the United States, where we believe that the offshore Atlantic area has a similar geology.

In some areas we appear to be marching backward. The buy-back of Federal leases where discoveries had already been made in the Destin Dome area (offshore Florida) of the eastern Gulf of Mexico was a serious step backward in terms of satisfying consumer gas demand. This action was contrary to what needs to be done to meet America's energy needs. With Destin Dome we did not come full about, as we need to do; rather, we ran from the storm.

Geographic expansion of gas exploration and drilling activity has for the entirety of the last century been essential to sustaining growth in natural gas production. Future migration, to new frontiers and to new fields, in both the United States and Canada, will also be critical. Without production from geographic areas that are currently subject to access restrictions, it is not at all likely that producers will be able to continue to provide increased amounts of natural gas from the lower-48 States to customers for longer than 10 or 15 years. We believe that the same is true in Canada as well.

It is imperative that energy needs be balanced with environmental impacts and that this evaluation be complete and up-to-date. There is no doubt that growing usage of natural gas harmonizes both objectives. Finding and producing natural gas is accomplished today through sophisticated technologies and methodologies that are cleaner, more efficient, and much more environmentally sound than those used in the 1970's. It is unfortunate that many restrictions on natural gas production have simply not taken account of the important technological developments of the preceding 30 years. The result has been policies that deter and forestall increased usage of natural gas.

Second, we need to increase our focus on non-traditional sources, such as liquefied natural gas (LNG). Reliance upon LNG has been modest to date, but it is clear that increases will be necessary to meet growing market demand. Today, roughly 97 percent of U.S. gas supply comes from traditional land-based and offshore supply areas in North America. Despite this fact, during the next two decades, non-traditional supply sources such as LNG will likely account for a significantly larger share of the supply mix. LNG has become increasingly economic. It is a commonly used worldwide technology that allows natural gas produced in one part of the world to be liquefied through a chilling process, transported via tanker, and then re-gasified and injected into the pipeline system of the receiving country. Although LNG currently supplies less than 3 percent of the gas consumed in the United States, it represents 100 percent of the gas consumed in Japan.

LNG has proven to be safe, economical and consistent with environmental quality. Due to constraints on other forms of gas supply and increasingly favorable LNG economics, LNG is likely to be a more significant contributor to U.S. gas markets in the future. It will certainly not be as large a contributor as imported oil (nearly 60 percent of U.S. oil consumption), but it could account for 15–20 percent of domestic gas consumption 15–20 years from now if pursued aggressively and if impediments are reduced.

It is unlikely that LNG can solve the entirety of our problem. A score of new LNG import terminals have been proposed, some with capacities in excess of 2.5 billion cubic feet per day. However, given the intense "not on our beach" opposition to siting new LNG terminals, a major supply impact from LNG may be a tall order indeed.

Third, we must tap the huge potential of Alaska. Alaska is estimated to contain more than 250 trillion cubic feet of natural gas enough by itself to satisfy U.S. gas demand for more than a decade. Authorizations were granted 25 years ago to move gas from the North Slope to the Lower-48, yet no gas is flowing today nor is any transportation system under construction. Indeed, every day the North Slope produces approximately 8 billion cubic feet of natural gas that is re-injected because it has no way to market. Alaskan gas has the potential to be the single largest source of price and price volatility relief for U.S. gas consumers. Deliveries from the North Slope would not only put downward pressure on gas prices, but they would also spur the development of other gas sources in the State as well as in northern Canada.

Fourth, we can look to our neighbors to the north. Canadian gas supply has grown dramatically over the last decade in terms of the portion of the U.S. market that it has captured. At present, Canada supplies approximately 14 percent of the United States' needs. We should continue to rely upon Canadian gas, but it may not be realistic to expect the U.S. market share for Canadian gas to continue to grow as it has in the past or to rely upon Canadian new frontier gas to meet the bulk of the increased demand that lies ahead for the United States.

The pipelines under consideration today from the Prudhoe Bay area of Alaska and the Mackenzie Delta area of Canada are at least 5–10 years from reality. They are certainly facilities that will be necessary to broaden our national gas supply portfolio. We must recognize, however, that together they might eventually deliver up to 8 billion cubic feet per day to the lower 48 States—less than 10 percent of the natural gas envisioned for the 2025 market.

There is much talk today of the need for LNG, Alaska gas, and Canadian gas. There is no question that we need to pursue those supplies to meet both our current and future needs. Nonetheless, it is equally clear that, in order to meet the needs of the continental United States, we will need to continue to look to the lower 48 States.

RESPONSES BY ARTHUR E. SMITH, JR., TO ADDITIONAL QUESTIONS FROM
SENATOR VOINOVICH

Question 1. How we can increase the supply of natural gas and reduce natural gas prices today and over the long term.

Response. Because supply and demand are in such a tight balance, any increase in supply or reduction in demand should have a favorable impact toward lowering the price of gas or moderating its rise. Congress can take many steps to increase supply and to reduce demand.

Steps to Increase Supply: Intermountain West.—Congress should encourage the Administration (BLM, Forest Service) to issue short-term waivers for expansion of the Rockies (inter-mountain west region) drilling window for this winter.

Alaskan Natural Gas:

Congress should support efforts to expedite and facilitate the construction of the Alaskan natural gas pipeline to bring Alaskan natural gas supplies to the lower 48 States.

Liquified Natural Gas.—Congress should encourage the development of infrastructure to accept new supplies from LNG.

Natural Gas Pipelines and Facilities.—Congress should encourage FERC to continue acting on an emergency basis as needed and modify and implement its rules to accelerate and streamline the permitting and blanket certificate procedures for natural gas pipelines, especially to facilitate hurricane recovery efforts.

LIHEAP.—Congress can increase funding for LIHEAP for FY06 up to the authorized \$5.1 billion and consider amending LIHEAP eligibility criteria to allow larger numbers of low-income residents to take advantage of the program.

Steps to Reduce Demand:

The fastest growing sector of demand for natural gas is in electricity generation. Given that natural gas supplies are constrained, it is not wise to continue to rely on natural gas to provide 90 percent or more of our new electricity generation capacity. We support efforts to diversify the electricity generation fuel mix.

Question 2. What changes can we make to our environmental regulatory schemes to promote more diverse and efficient baseload generation (such as IGCC and nuclear plants)?

Response. The Clean Air Act has two categories of programs related to power generation. One program is “technology-forcing” and applies to new facilities, as Congress intended that new facilities have the best control technology available. The other program controls emissions from existing power plants. These programs ad-

dress very legitimate environmental areas; however, they are not intended to focus on energy supply needs.

As I testified on February 9, these programs have had an important effect on the situation during the last 5–6 years, in which there was significant installation of “easy” to permit natural gas fired generation and significant investment in pollution controls at existing power plants. When natural gas supply failed to keep-up with the incremental demand from the power sector, it highlighted the present energy issue—the need for investment in domestic fuel-diverse baseload generation.

A more holistic legislative approach on energy and environment policies would consider how to achieve both energy needs and environmental objectives. The previous Clear Skies Bill contained some promise in using fuel-weighted provisions to discourage fuel switching and providing some limited incentives for IGCCs and energy efficiency. However, the fundamental direction continued to be a “control” program designed to address existing generation, with new sources given only a limited share of the allocations.

Legislation could take a more holistic approach that promotes fuel diversity and allows a “compliance investment” option for companies electing to invest in new generation capacity (at existing or new power facilities). If companies could invest in clean generation, e.g., IGCCs as a compliance measure, the legislation could harness investment to achieve the same environmental results through new generation technology that can also address energy supply needs. Additionally, this cleaner energy could also address concerns about the need to reduce carbon intensity in the power sector (e.g., the increased generation capacity mix with a net increase in energy efficiency can achieve the same environmental results with a lower carbon intensity).

There are various allocation methods that “credit” new cleaner generation and energy efficiency improvements. Many power companies with a business focus on traditional coal-fired generation fair well with such an initial allocation on a fuel weighted basis. In addition, the allocation would then allow all companies with the compliance flexibility to invest in additional generation capacity.

Question 3. What do we need to do to address the natural gas storage and transportation constraints that exist in the United States?

Response. Constraints on Natural Gas Storage and Transportation—National Environmental Policy Act (NEPA) Recommendations.—In the 35 years since its enactment, compliance with NEPA has taken progressively longer and longer for natural gas projects. We do not, however, propose to alter the objectives of NEPA. On the contrary, NEPA remains an important environmental safeguard, balancing the needs of economic development with the need to protect environmental quality. Our suggested solutions deal with the implementation of NEPA, and in particular, the ways different Federal and State permitting agencies should work together under the Act.

A number of these solutions were part of the recently enacted Energy Policy Act of 2005, at least with respect to natural gas projects approved by the Federal Energy Regulatory Commission (FERC). We have grappled with the issue of NEPA compliance for many years, looking specifically at ways to reduce unnecessary delays and improve cooperation among the many Federal and State agencies that might be reviewing a proposed project. These suggestions do not alter existing environmental quality standards. They do, however, increase the level of accountability, cooperation and efficiency among permitting agencies—hardly an unfair or unreasonable set of expectations. We support extending these ideas to all types of energy project reviews under NEPA, not just FERC-approved natural gas projects.

Recommendation 1. Establish a clearly defined “lead agency” for each type of proposed project.—On any given proposed project for development, there can be conflict among agencies as to who should take the lead. There does need to be one lead agency for each type of project though, and direction from Congress or the Council on Environmental Quality (CEQ) could resolve such conflict before it arises. For example, section 313 of the new Energy Policy Act designates the FERC as the lead agency under NEPA for all projects requiring an authorization or approval pursuant to the Natural Gas Act; in other words, all interstate natural gas pipelines, storage facilities, or LNG import terminals. The lead agency should be one that has primary responsibility for the ultimate approval of an activity or project.

Recommendation 2. Allow the lead agency to institute specific timelines for NEPA reviews.—As stated in AGA’s February 6, 2006 comments on the Senate draft NEPA white paper, (page 2 Recommendation 1.2, attached), AGA supports the Senate Task Force’s recommendation to amend NEPA to set an 18-month limit on the time to prepare and complete an EIS, and to set a 9-month limit on the time to prepare and complete an EA. We agree with the Senate Task Force that this should be the rule, and that exceptions should be allowed only in unusual situations and only

when approved by the Council on Environmental Quality (CEQ). In addition, in order to help the lead agency to meet this deadline, the lead agency should be allowed to establish specific timelines for NEPA reviews.

This recommendation is important to keeping the review process manageable while providing some time certainty to applicants. While most agencies are willing to work with the sister organizations in a cooperative manner, our own experience in the gas pipeline industry is that some agencies will use inaction as a way to delay and even kill a project. If the lead agency is empowered to set a schedule, and to establish joint agency meetings and reviews, then the process becomes more cooperative and efficient as agencies negotiate face-to-face rather than from some distance. Here again, section 313 of the Energy Policy Act allows the FERC, for pipeline and LNG projects, to set such a schedule. However, the Act also states that the FERC should incorporate any existing timeframes any agency might have to reach a decision on a permit. An amendment to NEPA should establish that the lead agency has overall authority to establish a time schedule for review and all cooperating agencies must act within that timeframe.

Recommendation 3. Ability to enforce a lead agency deadline.—Ideally, the ability to set a deadline should be coupled with a way to enforce the deadline, so that agencies take a lead agency deadline seriously. Several earlier versions of the Energy Policy Act contained a provision requiring cooperating agencies to either act within the FERC-approved deadline (for natural gas projects), or else have their approval “conclusively presumed.” Both the Coastal Zone Management Act (CZMA) and the Clean Water Act contain deadlines for State enforcement agencies to either make permitting decisions or have their approval assumed, so the proposals in the Energy bill debate were not all that unusual. Nonetheless, the Energy Bill Conference Committee decided to be more conciliatory, by instead allowing an applicant to appeal an agency permitting-delay to the U.S. Court of Appeals for the D.C. Circuit. We believe there must be a mechanism applicable to all involved agencies that allows the lead agency to enforce its schedules.

Recommendation 4. Creation of a consolidated record for a NEPA review and all permitting decisions.—The lead agency should be charged with the responsibility to develop a consolidated record for the NEPA review and EIS development, and all permitting decisions required as a result. Once again, this encourages the various Federal and State agencies to work together in a cooperative fashion to develop a consolidated record. In order to make sure that agencies take this requirement seriously, Congress should require that this consolidated record be the record used for all subsequent appeals or administrative reviews.

A consolidated record is important. Our industry has found that some agencies have “sat out” on FERC NEPA reviews of proposed projects, and then subsequently appealed FERC’s approval decisions and attempted to develop a *de novo* review of all the facts previously considered by FERC and the cooperating agencies. Developing an entirely new record, when ample opportunity is given to participate in the development of the first one, is time-consuming and unfair to all of the agencies that did participate cooperatively. This consolidated record requirement is a part of the Energy Policy Act with respect to natural gas projects; it should be considered for other NEPA approvals as well.

Recommendation 5. Streamline subsequent reviews and permit approvals for projects managed pursuant to the Pipeline Safety Improvement Act.—The natural gas industry is facing a huge amount of work to comply with the safety regulations codified pursuant to the passage, in 2002, of the Pipeline Safety Improvement Act. The Act created specific timeframes for all natural gas transmission pipelines to assess (or inspect) the integrity of all pipeline located in populated areas. By December of 2012, all pipelines located in these “high consequence areas” must have a baseline assessment of their integrity. These inspections, and any subsequent repairs, will require significant excavation activity, triggering permit requirements. The ability to obtain the necessary permits, so that this inspection/repair activity can be completed pursuant to the congressionally mandated timeframe, will be critical to the success of the program.

Most of the affected pipelines have already developed an EIS years ago, as part of any construction or expansion activity. We need to make certain that the permitting process for the integrity management program recognizes previous environmental work, and gives pipeline operators some flexibility to meet requirements that, after all, have been mandated for safety purposes by Congress.

In the event that a pipeline has work that must be performed pursuant to compliance with the regulations under the Pipeline Safety Improvement Act and that particular pipeline segment has never had an EIS performed on its facilities, NEPA should allow for expedited analysis of impacts by the lead agency and the establishment of a streamlined review schedule for all cooperating agencies that meets the

safety requirements imposed by the Office of Pipeline Safety (OPS) within the Department of Transportation (DOT) Pipeline and Hazardous Materials Safety Administration (PHMSA).

Recommendation 6. Make a "Team Permitting" opportunity available on voluntary basis. This voluntary process, would be one similar to the "Team Permitting" concept employed within the State of Florida, pursuant to Chapter 403.075, Florida Statutes, for early coordination with regulatory agencies, local governments, and special interest groups for development-related permitting.

An amendment to NEPA could include a section to establish the opportunity for a developer to engage a lead agency, other regulatory stakeholders, and interested parties in an open process in which all NEPA issues could be identified and dealt with to the satisfaction of those involved. In this voluntary process, an applicant seeking any Federal permit applicable for NEPA review could enter into a non-binding agreement with the Federal "lead agency." This would be initiated by the applicant and would be only on a voluntary basis. Once initiated by the applicant, the lead agency would notify all potential cooperating agencies of the opportunity to join this collaborative and advisory "Team Permitting Group." A Federal notice of such meetings of the group would be published and any interested party could join the review process (this could include any environmental group or other interested party). A schedule for review and processing of all permits would be developed by the lead agency and the Team Permitting group and all milestone dates for processing would be met by the applicant as well as the agencies involved.

In Team Permitting all permitting agencies and interested parties would meet together and work simultaneously on the technical aspects of the proposed development and to reduce the overall total impact of the project. This would also include any necessary mitigation. This collaborative effort on the technical aspects of the proposal would greatly help the various regulatory permitting personnel who too often work in a silo effect as they assess the impact of the proposed development and any mitigation that might be required. In order to enter into this voluntary Team Permitting process, the applicant would pledge, in the beginning, to do what will be referred to as "net ecosystem benefits" which will be over and above any level of mitigation assigned by the various permitting agencies. No "net ecosystem benefits" would be performed by the applicant until all timely permits are issued, required mitigation agreed to by the parties, in accordance with the schedule agreed to in the beginning by the Team Permitting Group. Their respective regulatory division will issue all individual required environmental permits from Federal regulatory agencies, from any State government, as well as any local government. Again, the agreed to "net ecosystem benefits" will not be performed by the applicant unless all permits are issued in accordance with the agreed to schedule.

Recommendation 7. Streamline NEPA permit reviews and approvals by adopting a process similar to the one used pursuant to CERCLA (or Superfund).

Permitting for projects undergoing NEPA review (especially those that have an existing EIS) could be managed in a manner similar to the way in which permits are expedited pursuant to CERCLA. In the early 1980's, Congress faced a similar situation with response actions needed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as Superfund. This legislation required the EPA or potentially responsible parties to respond to releases of hazardous constituents. During the initial implementation of CERCLA, it was quickly recognized that Federal, State or local requirements imposed significant delays to this critical work. To avoid these delays, legislation was passed to require EPA to impose all substantive requirements of these rules, but exempted the projects from the administrative aspects of Federal, State and local requirements. Natural gas facilities could be sited, permitted, constructed, repaired and upgraded, pursuant to an amended NEPA that would have language similar to the language contained in section 121 of CERCLA.

Under this revised process, during the NEPA review the lead Agency would act in a manner similar to the role EPA plays in authorizing work under CERCLA. Applicants would be required to discuss and comply with substantive requirements of all applicable, relevant and appropriate requirements (known as ARARs under CERCLA). The public and any affected Agencies would have an opportunity to comment on all planned work. However, the approval under NEPA would also constitute approval for all permits necessary to implement the work. This would greatly streamline the process to gain approval for needed maintenance or new construction while still insuring all technical requirements are met.

RESPONSE BY ARTHUR E. SMITH, JR., TO AN ADDITIONAL QUESTION FROM
SENATOR JEFFORDS

Question. Do you think more resources should be directed to this EPA program?

Response. Many AGA, as well as INGAA, member companies participate in EPA's Natural Gas Star program. It is voluntary, provides company recognition for finding ways to conserve natural gas supply and contributes to technology and best practice exchange and development. EPA contracts with private consultants to facilitate technical assistance/exchange with companies and to EPA relative to natural gas conservation. Additional resources would allow EPA to increase this technical assistance and provide R&D to advance technologies that can help detect and reduce fugitive natural gas emissions.

Additional assistance in the way of R&D funding would be of value to natural gas companies at this time. Many natural gas companies are focusing resources on DOT requirements for integrity management, adding new supply/infrastructure and dealing with declining customer usage with the high natural gas prices. In addition, traditional R&D funding is declining from FERC, DOE, GRI, and the like. These funding mechanisms are being reduced and in some cases, eliminated. R&D funding could advance technologies that improve efficiencies and reduce emissions. If Congress were to provide more funding for EPA for R&D that could help the industry more cost effectively detect fugitive natural gas emissions and develop methods to reduce natural gas leaks, that would help reduce greenhouse gas emissions and help stretch our national natural gas resources.



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FEBRUARY 6, 2006

Via Electronic Mail
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NEPA Draft Report Comments
c/o NEPA Task Force
Committee on Resources
1324 Longworth House Office Building
Washington, D.C. 20001

Re: AGA Comments on Initial Findings and Draft Recommendations of Task Force
on Improving and Updating NEPA, Committee on Resources, U.S. House of
Representatives

To the Honorable Members of the NEPA Task Force:

The American Gas Association (AGA) appreciates the opportunity to comment on the initial findings and draft recommendations made in a report dated December 21, 2005 by the staff to the Task Force on Improving and Updating the National Environmental Policy Act (NEPA). AGA commends the House Committee on Resources and the Task Force for undertaking this important and formidable task.

The American Gas Association, founded in 1918, represents 197 local energy utility companies that deliver natural gas to more than 56 million homes, businesses and industries throughout the United States. AGA's members account for roughly 83 percent of all natural gas delivered by the nation's local natural gas distribution companies. AGA is an advocate for local natural gas utility companies and provides a broad range of programs and services for member natural gas pipelines, marketers, gatherers, international gas companies and industry associates. Natural gas meets nearly one-fourth of the United States' energy needs. Our Association is sharply focused on assisting its member utilities obtain and deliver stable supplies of clean-burning natural gas, safely and reliably. For more information, go to www.aga.org.

Over the past five years American consumers of natural gas have borne the brunt of ever increasing prices, the natural outcome of an increasingly tight balance between supply and demand. During that time the price for natural gas has increased over 400 percent, causing severe financial hardship for manufacturers, farmers, homeowners and



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February 6, 2006
Page 2 of 8

other consumers throughout the land. AGA believes that NEPA reform can help ease the supply demand imbalance and reduce financial hardship on consumers by making environmental reviews for natural gas production, transmission and delivery projects more effective and efficient.

AGA's specific comments on the Task Force Recommendations are as follows.

Group 1 – Addressing Delays in the Process

Recommendation 1.1: Amend NEPA to define “Major Federal Action”

AGA supports the recommendation to define “major federal action” in the statute so that the term would “only include new and continuing projects that would require substantial planning, time, resources, or expenditures.” In addition, categories of projects that typically are not “major federal actions” should be categorically excluded from NEPA review. We believe it is important when crafting the statutory definition of “major federal action” to provide very clear criteria for identifying projects that would require “substantial planning, time, resources or expenditures” and to avoid or define broad terminology such as “major” and “significant.”

This reform should help agencies determine when an environmental impact statement (EIS) is really warranted. Under existing (ambiguous) law, agencies err on the side of extreme caution, and seem to default to preparing an EIS without questioning whether an action is truly “major.”

Recommendation 1.2: Amend NEPA to add mandatory timelines for competing NEPA documents.

AGA supports this recommendation to set an 18-month limit on the time to prepare and complete an EIS, and to set a 9-month limit on the time to prepare and complete an EA. We agree that this should be the rule, and that exceptions should be allowed only in unusual situations and only when approved by the Council on Environmental Quality (CEQ).



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Recommendation 1.3: Amend NEPA to create unambiguous criteria for the use of Categorical Exclusions (CE), EAs, and EISs.

AGA supports this recommendation. We especially support amending NEPA “to state that temporary activities and other activities that have clearly minimal impacts should be evaluated under a CE unless the agency has compelling evidence to utilize another process.” Projects to repair sections of natural gas pipelines and natural gas utility lines are small, linear, and temporary, and their impacts are clearly minimal. Natural gas pipeline and gas utility line repairs should be evaluated under a categorical exclusion.

Recommendation 1.4: Amend NEPA to address supplemental documents.

AGA supports this recommendation to codify criteria for deciding when to prepare supplemental environmental assessments (EAs) or EISs.

AGA also strongly supports the related Group 8 recommendations that will help create more certainty in part by clarifying the meaning of “cumulative impacts.” Business plans and work schedules are built around final agency actions. Delays are particularly problematic when there are numerous supplemental EAs and EISs required after the process is concluded.

Group 2 – Enhancing Public Participation

Recommendation 2.1: Direct CEQ to prepare regulations giving weight to localized comments.

AGA does not support 2.1 in its current form, because it could inadvertently give undue weight to stakeholders who oppose projects on emotional grounds – the proverbial “not in my backyard” (NIMBY) response. The interests of local stakeholders should be considered, and as with all comments, we would hope the federal decision maker will give weight to well-reasoned, substantive comments offered by those most affected by the proposed decision.



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Recommendation 2.2: Amend NEPA to codify the EIS page limits set forth in 40 C.F.R. 1502.7.

This is a recommendation to codify the following EIS page limits: “The text of final environmental impact statements (e.g., paragraphs (d) through (g) of §1502.10) shall normally be less than 150 pages and for proposals of unusual scope or complexity shall normally be less than 300 pages.” 40 C.F.R. §1502.7 (emphasis added).

AGA supports this recommendation, with one suggested change. We concur that EIS documents have grown too long. However, we are concerned that an overly prescriptive page limit could result in more public dissatisfaction in some cases. It is important to provide enough flexibility so that an agency has enough space to describe an unusually complex project completely enough to prevent misunderstanding of the project by the public. Therefore, AGA recommends providing clear criteria to help an agency determine when a proposal should be considered to be of “unusual scope or complexity” that warrants an EIS to be longer than 150 pages. Second, to ensure that the exception does not swallow the rule, but that exceptions are allowed when appropriate, we recommend requiring CEQ approval for exceeding the 150 or 300 page “normal” page limits. This would be similar to the CEQ approval suggested in Recommendation 1.2 for exceeding the normal time limits for completing an EIS.

With those two changes, AGA supports Recommendation 2.2, as we believe this will help improve efficiency, focus environmental analysis on potential significant impacts, and reduce NEPA-related costs.

Group 3 – Better Involvement for State, Local and Tribal Stakeholders

Recommendation 3.1: Amend NEPA to grant tribal, state and local stakeholders cooperating agency status.

AGA opposes this recommendation. The process of identifying potential non-federal cooperating agencies, inviting them to be cooperating agencies, receiving a response from them, and then implementing a formal agreement with all cooperating agencies would delay the start of scoping and would add significant time to the overall NEPA process. Our members have found that the cooperating agency process has created some confusion.



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NEPA regulations already contain provisions for stakeholder involvement (40 C.F.R. 1501.7). Rather than grant non-federal agencies cooperating agency status and attempt to negotiate an agreement with an unwieldy number of agencies, it would be better to clarify rules for stakeholder involvement. AGA recommends that NEPA should be amended to direct CEQ to issue regulations to clarify the stakeholder involvement procedures and to encourage more stakeholder involvement. (See comment on recommendation 6.1.)

Recommendation 3.2: Direct CEQ to prepare regulations that allow existing state environmental review process to satisfy NEPA requirements.

AGA supports this recommendation, as it should help reduce redundancy and improve efficiency in the environmental review process.

Group 4 – Addressing Litigation Issues

Recommendation 4.1: Amend NEPA to create a citizen suit provision

AGA supports creating a citizen suit provision, subject to the criteria described in recommendation 4.1 with one exception. We oppose the 180 day period for filing citizen suits. Instead, the time frame for filing a citizen suit should be 30 days – the same period that is already established for filing appeals.

Recommendation 4.2: Amend NEPA to add a requirement that agencies “pre-clear” projects.

AGA supports 4.2.

Group 5 – Clarifying Alternatives Analysis

Recommendation 5.1: Amend NEPA to require that “reasonable alternatives” analyzed in NEPA documents be limited to those which are economically and technically feasible.

AGA supports 5.1. In addition, we recommend clarifying that when comparing the anticipated impacts of a linear pipeline project to other reasonable alternatives, that the impacts of digging a trench, burying a pipeline and restoring vegetation above the line are mostly temporary. Agency officials involved in NEPA review often are more familiar with highway projects, and they often conduct the alternative impacts analysis with the



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false assumption that pipeline projects and highways have similar environmental impacts, which is not the case. Highways remain above ground and have more permanent impacts on the environment than buried pipelines.

Recommendation 5.2: Amend NEPA to clarify that the alternative analysis must include consideration of the environmental impact of not taking an action on any proposed project.

AGA supports 5.2. The "no action alternative" should also include the economic impacts of taking "no action" – for example of not approving the construction of a natural gas pipeline -- on the project proponent and on others who would benefit from the proposed action, such as industrial, commercial, small business and residential consumers of natural gas, as well as the employees of manufacturers who rely on natural gas as a feed stock for their products.

Recommendation 5.3: Direct CEQ to promulgate regulations to make mitigation proposals mandatory.

AGA requests that the Task Force clarify recommendation 5.3. If NEPA is amended to direct CEQ to require that federal agencies include in any mitigation proposal a binding commitment to proceed with the mitigation, then the NEPA amendment should also direct CEQ to make it clear to all parties that the mitigation proposal does not have to be complete when the permit is issued. Instead, appropriate mitigation could be made a condition of the agency's order and made legally enforceable. Otherwise, recommendation 5.3 as it stands could create another barrier to expediting the NEPA review and decision making process by requiring the project proponent to complete all mitigation proposals prior to the issuance of a license or permit. This would not save time or cost. It would *increase* delays and cost.

Group 6 – Better Federal Agency Coordination

Recommendation 6.1: Direct CEQ to promulgate regulations to encourage more consultation with stakeholders.

AGA supports 6.1. We support the effort to encourage more stakeholder involvement rather than granting cooperating agency status to stakeholders (as in recommendation 3.1). We also recommend clarifying in the statute what "periodically consult in a formal sense" means.



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Recommendation 6.2: Amend NEPA to codify CEQ regulation 1501.5 regarding lead agencies.

AGA supports 6.2. We believe it is particularly important to spell out lead agency responsibility "to develop a consolidated record for NEPA reviews, EIS development, and other NEPA decisions."

Group 7 – Additional Authority for the CEQ

Recommendation 7.1: Amend NEPA to create a "NEPA Ombudsman" within the CEQ.

AGA supports 7.1. This could help improve conflict resolution.

Recommendation 7.2: Direct CEQ to control NEPA related costs.

AGA supports 7.2.

Group 8 – Clarify meaning of "cumulative impacts.

Recommendation 8.1: Amend NEPA to clarify how agencies would evaluate the effect of past actions for assessing cumulative impacts.

AGA supports 8.1 to provide reasonable bounds on the scope of cumulative impacts analysis.

Recommendation 8.2: Direct CEQ to promulgate regulations to make clear which types of future actions are appropriate for consideration under the cumulative impact analysis.

AGA supports 8.2.



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Group 9 – Studies.

Recommendation 9.1: CEQ Study of NEPA's interaction with other Federal environmental laws.

AGA supports 9.1 to reduce redundancy and improve efficiency of the environmental review process.

Recommendation 9.2: CEQ Study of current Federal agency NEPA staffing issues.

AGA supports 9.2 to improve the quality of NEPA staff at key Federal agencies, especially in the area of project management..

Recommendation 9.3: CEQ study of NEPA's interaction with state "mini-NEPAs."

AGA supports 9.3 to reduce redundancy and improve efficiency of the environmental review process.

If you should have any questions, please call Pam Lacey at 202-824-7340.

Respectfully submitted,

American Gas Association

A handwritten signature in black ink that reads "Pamela A. Lacey". The signature is written in a cursive, flowing style.

By: _____
Pamela A. Lacey
Senior Managing Counsel
(202) 824-7340
placey@aga.org

STATEMENT OF JOEL BLUESTEIN, ENERGY AND ENVIRONMENTAL ANALYSIS, INC.

Thank you Mr. Chairman and members of the committee for the opportunity to testify today. My name is Joel Bluestein and I am the president of Energy and Environmental Analysis, Inc. EEA is located in Arlington, Virginia and has been providing energy and environmental consulting services since 1974. Our major areas of expertise include:

- Analyzing and forecasting the supply, demand and price of natural gas
- Analyzing the impacts of energy and environmental policy on energy markets

We have done this work for industry, government and institutional clients.

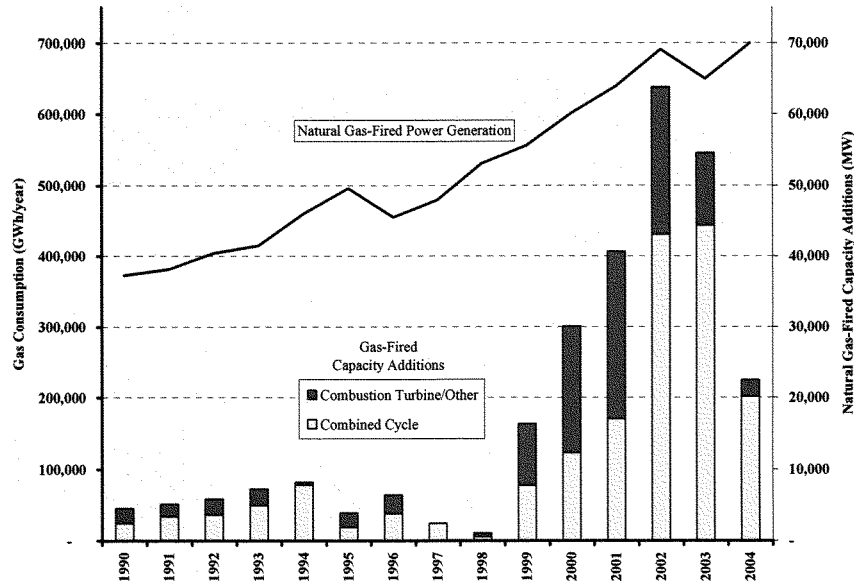
The spot price of natural gas has increased substantially over the last 5 years. Excluding the temporary effects of the hurricanes in late 2005, the prices have increased from the \$2 to \$3/MMBtu range to the \$8/MMBtu range. While the prices paid by most consumers have not increased proportionally, the higher prices have certainly created hardships for retail gas users as well as for business and industry.

The reason for this rapid increase in gas prices is widely agreed to be a combination of growing demand and limited supply for natural gas. Both sides of this equation must be addressed in order to find a solution. On the demand side, the power generation sector is the fastest growing component of the natural gas consuming sector. Almost all of the power plants built in the last 15 years have been gas-fired. Over 200 GW, of new natural gas-fired power plants have been built in the last 5 to 6 years, the largest such increase in power plant capacity in our history.

There is a common belief that these new gas plants are the cause of the increase in gas consumption for power generation and that the recent focus on gas-fired power plants is due primarily to environmental regulation. The corollary to the second belief is that if we could just somehow change the existing environmental regulations then there would be a big shift to coal-fired power plants, gas consumption would go down and gas prices would go back to \$3/MMBtu. Unfortunately, all of these last assumptions are incorrect.

The historical data¹ clearly show (Figure 1) that gas-fired electricity generation has been increasing continuously and at about the same rate since at least 1990, well before the recent boom in power plant construction and the increase in natural gas prices. From 1990 to about 1999 there was very little construction of new power plants, in large part due to the uncertainty about restructuring of the electric power industry. From 1999 to 2005, over 200 GW of new gas-fired generating capacity was built in the United States. However, this construction has not increased the growth rate of gas-fired generation. In fact, the growth declined slightly from 2002 through 2004.

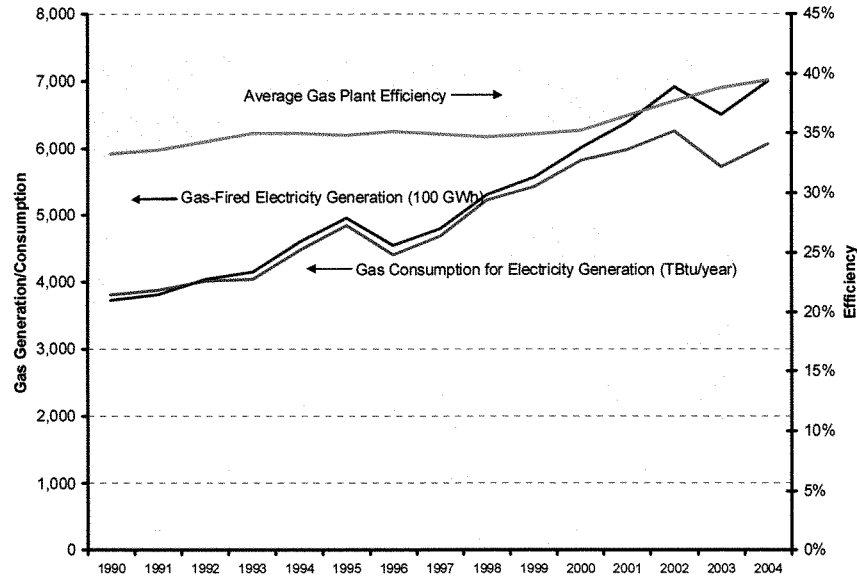
¹All data in this testimony are from the U.S. Energy Information Administration unless otherwise noted.

Figure 1 - Historical Gas Fired Generation and Plant Construction

Not only have the new power plants not increased gas consumption, they actually have reduced gas consumption relative to what would have occurred in their absence. This is because many of the new plants were built in regions that were already dependent on older, less efficient gas power plants. In these regions, such as Texas and California, the new, more efficient plants have displaced the older less efficient power plants, reducing the amount of gas that would have otherwise been consumed. Figure 2 shows the effect of this efficiency improvement on gas consumption for power generation. It indicates that the improved efficiency reduced gas consumption by about 1,000 trillion Btu or 1 trillion cubic feet in 2004. That said, there are some states, such as Louisiana, in which utility regulations are allowing incumbent utilities to continue to use older, less efficient plants while new, more efficient plants sit idle or underutilized. Remedying this situation is one way to rapidly reduce the amount of gas consumed for power generation.

The question raised in this hearing is whether or how much clean air regulation has led to the increased use and construction of gas-fired power plants. In fact, air regulation is only one of many drivers for the use of gas and probably not the most important one.

Figure 2 – Increase in Natural Gas Power Plant Efficiency



Our environmental regulations do not single out individual fuels for priority treatment. The most significant differentiation between fuels historically has been to set less stringent limits for coal plants than for gas plants. While there is no question that gas-fired plants are cleaner than coal-fired plants, our environmental regulations require more aggressive reductions for cleaner plants such that the cost per ton of NO_x control for new natural gas plants, for example, can be higher than the equivalent cost for new coal plants. In addition, many of the recent environmental programs have been cap and trade programs, which provide great compliance flexibility and are designed to avoid forcing the shutdown of older, high emitting plants. If anything, these programs have undervalued the efficiency and low emissions benefits of gas-fired plants by providing them with fewer trading allowances than provided to coal plants with the same electric output. So gas plants are not getting preferable treatment on emission regulation. And despite their low emissions, natural gas power plants have faced substantial opposition from local communities and activists in many parts of the country.

Some of the reasons other than environmental regulation for the increased construction of gas-fired plants are that the gas plants:

- Have a much lower capital cost—about half that of coal plants. This was especially important for the non-utility developers who built most of the plants in recent years.
- Require less land—key for construction in many areas near urban centers with attractive electricity markets.
- Do not require access to rail or water links for coal delivery—another advantage for flexibility of siting.
- Take less time to build—a key advantage during the very competitive building boom of the last 5 years.
- Can respond more quickly to changes in load.
- Require less water—a vital issue in many areas.

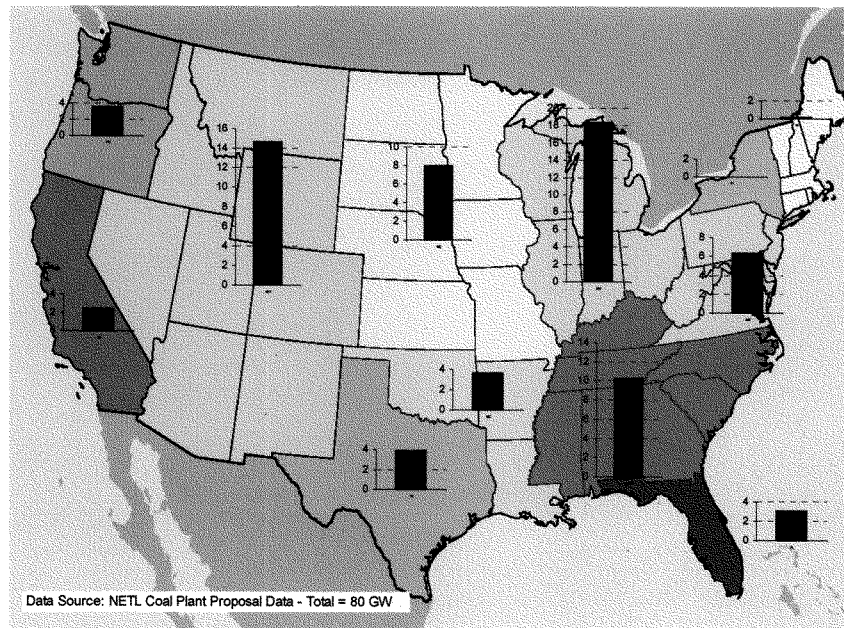
The recent generation of power plants was planned during the late 1990's and was built by independent, competitive, non-utility power developers expecting to compete in a restructured, competitive power market. There was a premium on being the first plant into that market. Natural gas prices were below \$3/MMBtu. Combined with the low capital cost, high efficiency, short construction time and other advantages, gas plants were the obvious choice. Any plausible change in environmental regulation would have had little effect on the choice of gas technology over coal at that time.

The economics of new plant construction have now changed significantly. With the current gas prices, new gas plants are not economically competitive with coal plants and many are running at very low levels of utilization or not at all. Today's higher gas prices have resulted in higher electricity prices in many regions, creating a very high value for coal-fired generation. The U.S. DOE is currently tracking about 135 planned or proposed plants comprising 80 GW of new coal generation (Figure 3). Construction is beginning on a number of new coal plants. These proposals include plants using supercritical steam, circulating fluidized bed and integrated gasification combined cycle technologies. While not all of the proposed plants will ultimately be built, these new coal plants are designed to cost-effectively meet all the current emission requirements for conventional pollutants. Admittedly, it can be difficult to site and permit a coal plant and there are many regulatory avenues that can be used to delay construction; however that is also true for gas power plants, wind farms and most types of energy infrastructure.

In discussing the construction of new coal plants, it is commonly asserted that passage of the Clear Skies Act will facilitate the construction of new coal plants by providing certainty regarding regulation of conventional pollutants. While this is true in part, it ignores that fact that uncertainty over the future regulation of CO₂ emissions is an even larger impediment for potential builders of coal plants. An increasing number of power companies are making clear that they cannot commit to large investments in new coal plants with a lifetime of 40 or 50 years without reasonable certainty on their future CO₂ regulatory liability. They are suggesting that it may not be less regulation but more regulation in the form of four pollutant regulation that could help accelerate the construction of new coal plants.

One other topic related to environmental regulation is the use of fuel-switching. Fuel-switching usually refers to switching gas-fired boilers to residual oil during periods of high gas prices, typically during peak winter heating periods. This is an important option for limiting peak natural gas prices. Many switchable boilers have regulatory limits on how much they can switch during the year. States have the option of reviewing or modifying these limits or suspending them during periods of limited gas supply. Some States in the Northeast have prepared to do just that during this winter if necessary. Most of the new gas-fired plants do not have alternative fuel capability and requiring them to have oil-back capability is another common suggestion to address prices. Given current oil prices, switching to oil is not very attractive economically except during periods of unusually high gas prices.

Figure 3 – Proposed New Coal Power Plants - 2006



While short-term fuel-switching to oil during peak price periods is an important mechanism to relieve demand and limit prices for a short period of time, it does not create significant downward pressure on overall gas prices. That would require long-term switching or conversion of gas-fired plants to oil or coal. While conversion to oil is the more technically feasible option, it could create a significant increase in our oil consumption. For the newer gas plants, this would be distillate oil, which competes with diesel fuel, heating oil and jet fuel. Stimulating a large increase in oil consumption does not seem to be consistent with our current energy policy goals. That brings us back to increased use of coal, which I've addressed above.

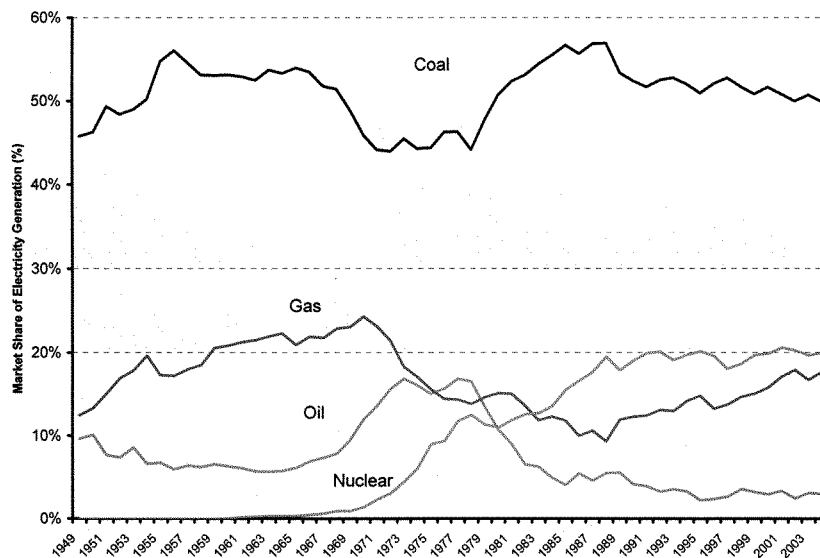
In short, environmental regulation has not been the primary reason for the recent growth in gas generation. Going forward, environmental regulation can best encourage increased coal use if it addresses regulation of CO₂ as well as conventional pollutants. That said, any responses related to new power plant construction are mid-to long-term responses. Given the complexities and importance of the natural gas supply/demand issues, we should focus our attention on near-term supply and efficiency responses that can provide benefits in the shorter term.

RESPONSES BY JOEL BLUESTEIN TO ADDITIONAL QUESTIONS FROM
SENATOR JEFFORDS

Question 1. What was the natural gas share of total electric generation in the United States in 1970 (pre-environmental regulation) compared to today?

Response. The natural gas share of U.S. electricity generation in 1970 was 24 percent compared to about 18 percent in 2004. This is shown in Figure 1 (U.S. EIA data).

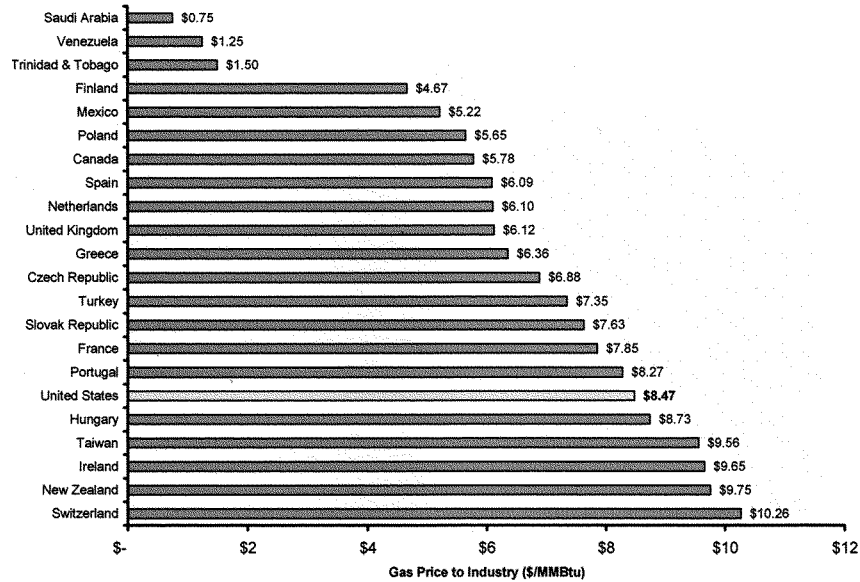
Figure 1 – Fuel Market Share of U.S. Electricity Generation



Question 2. We heard that the United States has the highest natural gas prices in the world, but we've also heard a lot about high gas prices in Europe recently. What are the current prices of natural gas and LNG in Western Europe? Historically, how have prices in the United States and Western Europe compared?

Response. Price comparisons are difficult due to the structural differences in gas markets in different countries. In addition, the prices can be very volatile and responsive to local conditions. For example, North American gas prices were higher in 2005 due to the effects of Hurricanes Rita and Katrina, which did not affect European prices. U.S. gas prices are currently low due to a mild winter while the same is not true for Europe. With those caveats, Figure 2 shows 2004/5 data from the EIA and International Energy Agency for gas delivered to industrial customers in different countries. The U.S. price includes the high year-end price due to the hurricanes. It also shows the very low prices in gas producing countries.

Figure 2 – Natural Gas Prices to Industrial Consumers 2004/5 (U.S. EIA and IEA Data)



We can also look at the most current price data reported in the trade press for March 22, 2006. This shows the currently tight gas supply situation in Europe and the high price for spot LNG deliveries.

Table 1 – Gas Market Indicators 3/22/06

	\$/MMBtu
U.S. Henry Hub Cash	6.72
NYMEX April Futures	6.84
U.S. LNG Delivery	9.98
IPE (European) April Futures	9.64
European LNG Delivery	9.69
Japan LNG Delivery	6.51

RESPONSE BY JOEL BLUESTEIN TO AN ADDITIONAL QUESTION FROM
SENATOR VOINOVICH

Question. Please provide your thoughts on how we can increase the supply of natural gas and reduce natural gas prices today and over the long term.

Response. The most complete answers to these questions are provided by the 2003 study on natural gas supply and demand prepared by the National Petroleum Council at the request of the U.S. Secretary of Energy.¹ The NPC study recommends a balanced program of:

- Reducing demand for natural gas through higher end use efficiency.
- Maintaining diversity in fuel use.
- Increasing North American gas supply through environmentally appropriate development in the lower 48 states, offshore and Alaska.
- Increasing imports of LNG.

These are still the appropriate answers.

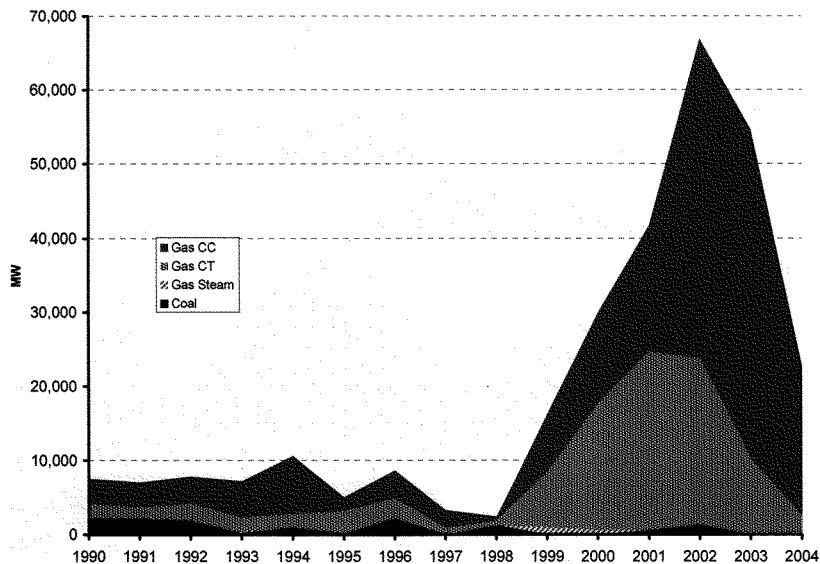
¹“Balancing Natural Gas Policy—Fueling the Demands of a Growing Economy”, National Petroleum Council, 2003, www.npc.org

RESPONSES BY JOEL BLUESTEIN TO ADDITIONAL QUESTIONS FROM
SENATOR LIEBERMAN

Question 1. Please state in absolute terms the extent to which coal-fired power plant capacity was increased after November 15, 1990. Please state in absolute terms to the extent to which natural gas-fired power plant capacity was increased after November 1, 1990.

Response. According to EIA data, gas generating capacity increased by 279 GW from 1990 through 2004. Coal generating capacity increased by 13 GW during that same period.

Figure 3 – Installation of New Coal and Gas Generating Capacity Since 1990



Question 2. Please assess the impact of the following factors on natural gas demand since 1990: the cost of natural gas, capital costs for new natural gas plants, opportunities for siting such plants, the time required to build such plants, and responsiveness to load changes of gas-fired power plants.

Please compare or contrast the effect of the requirements of the Clean Air Act and EPA's implementation thereof to or with the factors enumerated in the previous sentence in terms of their impact on natural gas demand.

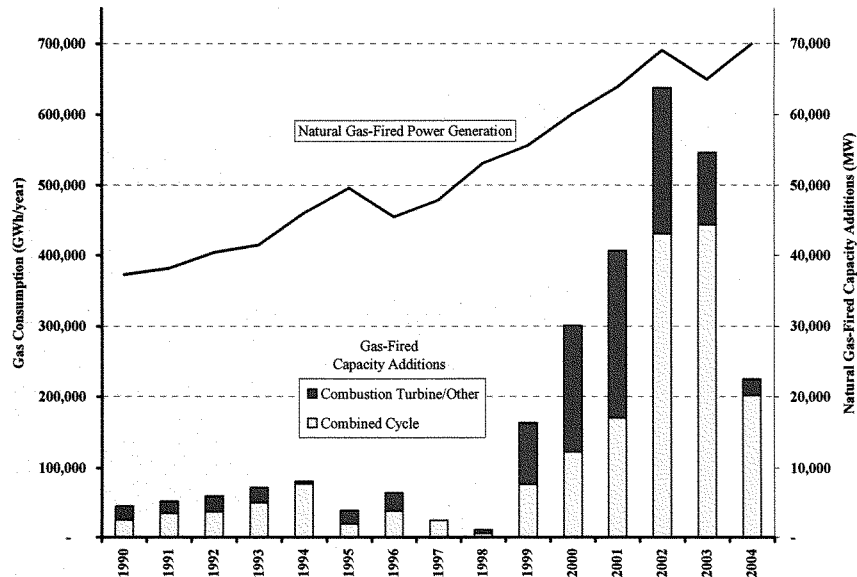
Throughout the 1990's a number of States, as well as the Federal Energy Regulatory Commission, restructured electricity ratemaking or deregulated it. Please describe the impact of electricity restructuring or deregulation on the building of new natural gas power plants and the demand for natural gas.

Response. These questions address two separate issues that are often treated as one but in fact are not strongly linked:

- The growth in natural gas consumption for power generation.
- The surge in construction of gas-fired power plants between 1999 and 2004.

Natural gas demand for power generation has been increasing steadily since the late 1980s. This growth has occurred for a variety of reasons. For the most part, it is not associated with the construction of new gas-fired power plants, which did not happen until the last 5 years (Figure 4). The growth in gas demand during the 1990's was largely a response to normal load growth in regions with a large amount of existing natural gas capacity such as California and Texas. Natural gas generators were the plants available to meet this load growth, accounting for most of the increased gas demand. Gas generation also increased at times during this period to offset periods of low hydroelectric generation.

Figure 4 – Natural Gas-Fired Generation and Plant Construction (1990-2004)



Most of the questions posed here relate to the surge in construction of gas-fired power plants over the last 5 years. This surge was the result of several factors:

- The preparation for and implementation of electric industry restructuring caused a period of uncertainty in the industry during the 1990's. One result of this uncertainty was a slowdown in power plant construction. Construction of new power plants of all types during the 1990's was lower than at any time since the 1950s.

- The move to restructuring resulted in a focus on power plant construction by non-utility developers. These developers were depending on project financing rather than traditional utility financing. The lower capital cost of gas-fired plants (approximately half that of a coal plant) was a huge advantage for these companies, who had to raise cash from investors to build the plants. The new market also created a premium for speedy plant construction to reach the competitive market before other developers. The short construction time for gas plants was also highly advantageous in this respect. At the gas prices prevailing during the late 1990's when these plants were developed, they were highly competitive with the more expensive coal plants.

- The small footprint and infrastructure requirements (fuel delivery, water requirements, land use, etc.) for gas plants allowed them to be sited close to electric load centers and in locations with high electricity market prices.

- Many of the new plants were peaking plants that operate only a few hundred hours per year and for which coal is not an economically viable option.

- The gas plants have much lower emissions than coal plants but still were required to go through a rigorous permitting process and faced stiff local opposition in many locations. The new source review process and other relevant environmental regulations establish more stringent emission limits for gas plants than for coal plants, so the gas plants' lower emissions did not substantially simplify the air emission permitting process relative to a coal-fired plant.

In short, there were a variety of market and institutional factors that led developers to focus on gas power plants during the late 1990's. Lower emissions were one contributing factor but were less important than developments in the market and the institutional factors that created a focus on gas power plant construction.

Finally, the surge of new gas power plants has not, as yet, resulted in a comparable surge in gas consumption. Whether this occurs will depend on other market factors that determine the future utilization of the new gas plants including the disposition of future environmental regulation including the treatment of CO₂ emissions.

STATEMENT OF JACK N. GERARD, PRESIDENT AND CEO, AMERICAN
CHEMISTRY COUNCIL

Good Morning. My name is Jack Gerard. I am President and CEO of the American Chemistry Council. Thank you for the opportunity to testify on behalf of the 900,000 men and women who work for the U.S. chemical industry, an industry that is essential to America's economic and national security.

I would like to focus my comments today on the consequences of the high cost of natural gas on the chemical industry and, by extension, on the entire manufacturing economy.

Chemistry consumes more than 10 percent of the Nation's natural gas. We use it to run our plants and as the key ingredient in the products we make. And since our products are found in 96 percent of all manufactured goods, it's safe to say that natural gas is a key ingredient to the Nation's manufacturing economy.

Last year, the Nation's natural gas bill topped \$200 billion for the first time in history. In 1999, the last time natural gas prices traded in its historic price band, the national gas bill was just over \$50 billion. Higher natural gas costs, according to the National Association of Manufacturers, are a major reason why the Nation has lost 2.9 million manufacturing jobs since 2000.

My industry's share of the gas bill topped \$30 billion last year, up from \$7.5 billion in 1999. In a few short years, the United States has gone from having the lowest cost natural gas in the industrialized world to the highest cost market. The impact has been staggering.

In a few short years, the U.S. chemical industry has lost more than \$50 billion in business to overseas operations and more than 100,000 good-paying jobs in our industry have disappeared. Put another way, the chemical industry went from posting the highest trade surplus in the Nation's history in the late 1990's to becoming a net importer by 2002. Other industries include forest and paper, agriculture, aluminum and steel, carpets, bedding and furniture, have a similar story to tell.

How did it happen? When you look at the data, the answer to us is clear. Too little supply being chased by rapidly increasing demand. For example, since the 1990's, there has been a 35 percent spike in natural gas consumption by the utility sector. That is 1.5 trillion cubic feet of new demand.

In that same period of time, domestic natural gas production remained flat. Prices spiked at the end of 2000 and have been on an upward trajectory ever since. In recent years, supply and demand have been balanced largely through industrial demand destruction. Simply put, when natural gas prices climb too high many industrial facilities simply cut back or shut down.

In the 1990's natural gas became the fuel of choice in the power sector for several reasons: low prices, lower capital costs, and burning natural gas helped bring utilities into compliance with new Clean Air Act requirements. At the time, it made a lot of sense for utilities to invest in gas-fired power generation.

What nobody seemed to know at the time was that existing sources of supply were unable to meet new sources of demand. When a supply response was needed, it didn't come.

To us, the real failure in government policy was that it did not open up new sources of natural gas supply to meet demand growth. Government stood by while short supplies of natural gas led to a price bidding war that drove more than 10 percent of industrial demand out of the market.

For too many years, U.S. policy has been trying to have it both ways. It can't continue. It is failing millions of Americans whose livelihoods depend on reliable supplies of natural gas at affordable prices.

The high price of natural gas is driving the global chemical industry out of the United States. For example, today there are more than 120 world-scale chemical plants—plants costing more than \$1 billion—under development around the world. Only one is being built in the United States. Business Week calls it the "hollowing out of the Nation's industrial core." By contrast, fifty of those new plants are being built in China.

It is in the Nation's interest to urgently bring new sources of natural gas supply in order to bring price relief to the market and to stop the erosion of the manufacturing economy. That will mean changes to 25 years of policies that have locked up more than 85 percent of the Outer Continental Shelf to deep water energy development. The resource potential is enormous.

That is why it is so frustrating to see proposals in Congress that would extend the off-limits signs in the OCS out to 150 to 250 miles off Florida's coast even as Cuba is hiring Chinese energy interests to explore for energy in waters that are barely 50 miles from Florida.

It is time for a change. It is time to strive for balance and reason. Here are three things Congress can do:

First, curb demand. Congress should continue to encourage all natural gas users to become more efficient. Last year's Energy bill has many good efficiency and conservation measures. Those measures should be fully funded and implemented.

Next, diversify fuel sources. In the 1990's natural gas fired power generation emerged as the technology of choice. Today, there are other good choices, including advanced coal, nuclear and renewables technologies. They should become the backbone of the power sector.

Finally, increase supply. We can no longer escape the fact that our Nation's currently available supply of natural gas can no longer meet the Nation's growing needs. We must increase access to new sources of supply that are currently off limits to use.

In conclusion, the issue is restoring balance to the U.S. natural gas policy in a way that helps manufacturers compete in global markets, permits utilities to branch into leading edge technologies, and ensures a reliable and affordable supply of natural gas for America's homes and businesses.

I'd be happy to answer your questions.

RESPONSES BY JACK N. GERARD TO ADDITIONAL QUESTIONS FROM
SENATOR JEFFORDS

Question 1. Your testimony includes a number of recommendations for Congress. The second recommendation discusses the need to diversify fuel sources. It mentions renewable energy, technologies I have supported for my entire career in Congress. I know your industry uses natural gas to produce your products, but you also use it as an onsite power source as well.

How do you see renewable energy playing a greater part in the future of the chemical industry? Or were you mentioning renewable energy as something that should be used by electric utilities, not the chemical industry?

Response. ACC advocates for the use of all available energy resources as the best means of addressing our long-term energy security. Within the business of chemistry, we pride ourselves for using energy wisely and efficiently.

Chemicals companies are investing in ways to make chemical feedstocks from renewable energy sources. DuPont, for instance, is building a plant to make a building block chemical for one of its fiber businesses by using industrial biotechnology to ferment corn. The company has set a goal of producing 25 percent of its chemical feedstock from renewable energy sources.

Traditional renewable energy such as wind, solar and hydroelectric, is typically not economically viable and/or available for the size operations that are typical of the chemical industry. That said, as these energy sources become more widely used and inexpensive, our industry, along with all of the U.S. economy, will benefit from affordable electricity that is generated by a widely diverse and affordable fuel supply that includes renewable energy.

Question 2. The industrial sector, which includes the chemical industry, is the largest consumer of natural gas, followed by the electrical power sector. Would you favor reinstatement of policies that would prevent or limit the use of natural gas for generating electric power, so that more natural gas could be available as a feedstock for the chemical industry?

Response. We do not support blanket prohibitions on natural gas use. We do believe that electric utilities should use natural gas as efficiently as possible and that policies should incent utilities to rely on a broad array of fuel choices.

Congressional action to balance the supply and demand of natural gas and broad diversification of our other energy sources will ensure that picking winners and losers in the energy markets is unnecessary. The use of natural gas as a valuable feedstock for the chemical industry is critical to our ability to competitively manufacture a multitude of products used every day in this country. Continued high prices for natural gas, driven by increased demand and short supply across the economy is undermining the ability for our companies to compete with our global competitors. Increasing the domestic supply of natural gas is critical to ensuring that enough reasonably priced natural gas is available for the variety of sources now using this valued commodity. So is providing economically viable alternative energy choices for utilities to help offset the rising demand for natural gas. A diverse energy portfolio coupled with a balanced natural gas supply/demand is essential to our industry's economic future as well as to the broader U.S. economy.

RESPONSES BY JACK N. GERARD TO ADDITIONAL QUESTIONS FROM
SENATOR VOINOVICH

Question 1. Please provide your thoughts on how we can increase the supply of natural gas and reduce natural gas prices today and over the long term.

Response. Short-term and longer term actions are both critical. Near term actions to increase efficiency and conservation would ease demand pressures and Congress needs to fund and encourage the rapid and full implementation of the 2005 Energy Policy Act. Opening access to the Nation's natural gas supplies is also an immediate need. The Senate should immediately pass the Domenici-Bingaman Lease Sale 181 bill. That would bring enough gas to market to heat 5 million homes for 15 years. Had Congress acted years ago when we started highlighting these problems, permits would be in place, pipelines either built or nearing completion and gas would have been flowing—and these would have been short-term solutions. We can't wait another decade, or even another year for Congress to act. Longer term, diversifying our energy portfolio through use of advance coal technologies, nuclear and renewable energy should be an activity that we can begin now, and continue to grow.

Question 2. You mentioned in the hearing that "Cuba is hiring Chinese energy interests to explore and drill for energy in waters that are barely 45 miles off the Florida coast." Please provide more information.

Response. Cuba is already exploring for energy 60 miles from Florida's coast, where U.S. exploration is prohibited by U.S. moratoria. [100 miles from Florida], and this exploration is accelerating. This should be of great interest to all Americans as we debate our Nation's energy policy.

- Several foreign oil companies have begun exploration in waters between Florida and the Cuba coast (north and west of Cuba, some 60 miles from the Florida coast), where U.S. exploration is prohibited. (Source: media reports, publicly available company Web sites, publicly available CIA Data Book, NOIA):

- Spain's Repsol—YPF
- Canada's Sherritt International
- Canada's Pebercan
- China's Sinopec
- China's CIINOC
- China's Petro China
- India's ONGC Videsh
- Venezuela's PDVSA

- Cuba [Cuban National Oil Company—Cuba Petroleo or Cupet] has signed joint venture exploration agreements with China, Canada, Spain and Brazil. (Houston Chronicle, 2/4/06)

- "Two Canadian energy companies, Pebercan and Sherritt International, [have] discovered oil in the Gulf of Mexico in an area under Cuba's control . . . Canadian companies had discovered estimated reserves of 100 million barrels." (New York Times, 1/11/06)

- Most of Sherritt's Cuban oil production is derived from oil fields located at [Cuban fields] Yumuri, Varadero, Canasi, and Puerto Escondido. Average net production in 2004 was over 19,000 barrels per day. (Source: NOIA)

- "Canadian oil company Pebercan has made a new discovery on the Santa Cruz 100 well in the Canasi field of Cuba's block 7, the company said in a December 24 statement . . . Pebercan is preparing an appraisal program . . . and two appraisal wells are set to be drilled" in 2006–2007. (Source: NOIA)

- "In 2004, Spanish petrochemicals company Repsol-YPF SA announced it had found petroleum reservoirs off Cuba's coast . . . Repsol will join up with China's largest offshore oil producer, CNOOC Ltd.; Norway's industrial company Norsk Hydro ASA; and India's state-owned Oil and Natural Gas Corp., ONGC." (Miami Herald, 2/2/06).

- Repsol was the first to conduct deepwater exploration and found good quality oil, but there was either not enough or it was too deep to pursue production. Repsol used Norway's Eirik Raude rig for drilling 18 miles off Cuba's northwest coast beginning in June 2004. (Source: Publicly available company Web sites, publicly available CIA Data Book).

- Canada's Pebercan drilled four exploration wells in the first quarter of 2005. Two new wells were brought on-stream. Pebercan currently has 12 oil-producing wells on the Seboruco deposit, compared with five as of March 31, 2004. (Source: NOIA)

- Repsol-YPF holds exploration rights to six blocks offshore northwest Cuba. In June 2004, Norwegian deep-water oil rig Eirik Raude, under contract with Repsol-YPF, began drilling two wildcat wells of Cuba's northwest coast. (Source: NOIA)

- “In one of the most closely followed wildcatting efforts in the Gulf of Mexico last year, Repsol YPF of Spain spent more than \$20 million to lease a Norwegian drilling rig to search for oil in Cuban waters.” (New York Times, 1/11/06)

- By longstanding convention the territorial waters boundary between the United States and Cuba is half the distance between the Florida Keys and Cuba’s coast, less than 100 miles. That means that drilling for oil and gas is taking place within 50 miles of the U.S. coast even though under U.S. policy American energy companies are barred from drilling along most areas of the U.S. coast. (ICIS News, 2/9/06)

- About 85 percent of resource-rich U.S. outer continental shelf (OCS) areas, chiefly along the East and West coasts and in the eastern U.S. Gulf, are closed to energy exploration and development under 25-year-old congressional moratoria. (ICIS News, 2/9/06)

Cuba’s Exploration Activities Off the Florida Coast are Accelerating.

- Cuba “has intensified its search for outsiders to develop oil fields off its northern and western coasts, not far from the tip of Florida.” (Houston Chronicle, 2/4/06)

- “Cuban officials . . . announced plans to double their drilling capacity and explore for oil in the waters off the Caribbean island. In the 2 years since oil deposits were found off its coast, Cuba has inked exploration deals with Canadian, Chinese, Indian and Norwegian firms.” (Associated Press, 2/5/06)

- “Chinese oil drilling equipment has been arriving in Cuba this year [2006] as state-run Cubapetroleo (Cupet) and its foreign partners prepare to significantly increase drilling along the northwest heavy oil belt, an 80-mile stretch of coast in Havana and Matanzas provinces.” (Natural Gas Week, 1/2/06).

- The newest is joint venture between Cuba’s state-run oil company, Cubapetroleo, and Chinese company Sinopec. The venture was agreed to in 2004, but has yet to occur. The exact location of the planned drilling is unknown, but it does lie between Cuba and Florida and most estimates provide a figure of 45 miles from the Florida Keys. (Source: Publicly available company Web sites, publicly available CIA Data Book)

- Production by a Canadian company (Sherritt) is slated to begin this year 90 miles from Key West. Sherritt’s existing production is concentrated off Cuba’s northern coast. In December 2004, Sherritt announced that drilling at a well in Santa Cruz was promising and will begin production in 2006. Santa Cruz del Norte oil field is located 33 miles east of Havana and 90 miles south of Key West. (Source: Publicly available company Web sites, publicly available CIA Data Book)

- “Analysts following Cuba’s energy industry said they expected Repsol YPF to continue drilling in Cuban waters later this year or in early 2006, together with Union Cubapetroleo, an energy concern controlled by the Havana government.” (New York Times, 1/11/06).

- Sinopec inked an agreement with CUPET to produce oil on the coast of western Pinar del Rio province. (Source: Publicly available company Web sites, publicly available CIA Data Book).

- “In the 2 years since oil reservoirs were discovered off Cuba’s coast, Canadian, Chinese, Indian and Norwegian companies have lined up to explore the potentially lucrative Caribbean waters.” (Miami Herald, 2/2/06)

- Brazil’s Petrobras expressed renewed interest in Cuban exploration in January 2005 and will likely join forces with Canada’s Sherritt and/or Spain’s Repsol for deep water drilling.

(Source: Publicly available company Web sites, publicly available CIA Data Book)

Meanwhile, Florida Senators are introducing new legislation that would extend off-limits areas out to 150 to 250 miles off Florida’s Coast.

- “[Republican Sen. Mel] Martinez and Democratic Sen. Bill Nelson are pushing for a buffer of 150 miles from Florida’s Panhandle. Rep. Jim Davis, D-Tampa, is seeking the same in a bill he introduced in the House on [Feb. 16].” (Orlando Sentinel, Feb. 17).

- “[Senators] Martinez and Nelson have proposed legislation that would open up a smaller area of the eastern Gulf to drilling [than the Domenici-Bingaman bill]—but only in return for a permanent, no-drilling zone that extends at least 150 miles off the rest of the Florida coast and renews the nationwide drilling moratorium until 2020.” (Los Angeles Times, 2/17/06).

- It is frustrating and ironic to see proposals in Congress that would extend the off-limits signs in the OCS out to 150 to 250 miles off Florida’s coast even as Cuba

is hiring Chinese energy interests to explore for energy in waters that are barely 50 miles from Florida.

- “Last month’s [oil] discovery already has Cuba watchers [in the U.S.] and officials [in Cuba] pondering potential changes in relations with the United States. American companies are currently prohibited from drilling in waters 100 miles or so from the coast of Florida . . . A significant oil discovery, one that could turn Cuba into an oil exporter from an importer, might prompt calls for reviewing policies that exclude the great majority of American companies from trading with Cuba.” (New York Times, 1/11/06)

- “The discovery last month by Pebercan of Montreal and Sherritt of Toronto illustrates how companies from other countries stand to benefit from the American embargo on most dealings with Cuba.” (New York Times, 1/11/06)

- “News of the [oil] find by the Canadian companies and the potential for larger discoveries of oil in the portions of the Gulf of Mexico controlled by Cuba are fueling speculation about how the emergence of Cuba as a promising oil exploration area might affect relations with the United States.” (New York Times, 1/11/06).

- “Drilling of an exploratory well in Cuba’s virgin Gulf of Mexico waters that could make the Communist nation an oil exporter and undermine the U.S. embargo has been completed, a [Cuban] senior official said. Work on the well by Spain’s Repsol YPF began in June and captured the attention of the industry and governments due to its potential economic and political consequences.” (“Exploratory Oil Drilling Done Off Cuba,” Reuters, 7/25/2004).

- “A commercially viable find could transform the cash-strapped island from oil importer to petroleum exporting nation, adding pressure on the United States to lift its four-decades-old trade embargo against President Fidel Castro’s government.” (“Exploratory Oil Drilling Done Off Cuba,” Reuters, 7/25/2004).

- “China is reaching out to acquire the energy it needs. Last fall for example, China signed an oil and gas agreement with Iran worth at least \$70 billion. Sinopec Group, a Chinese State run energy company, announced this year that they will be drilling for oil in Central Asia and Cuba. China has also reached out to Venezuela, South Africa and Angola.” (Speech by Gale Norton, U.S. Secretary of the Interior, before the Independent Petroleum Association of America, June 16, 2005).

- “The petroleum reservoirs have fueled the Cuban government’s hopes of increased self-sufficiency amid tightened U.S. sanctions.” (Miami Herald, 2/2/06).

- “Since 2004, Cuba has pumped \$1.7 billion into its energy sector with help from Canada, Europe and Latin America.” (Miami Herald, 2/2/06)

- “There is a 45-year-old U.S. embargo designed to undermine Fidel Castro’s communist government . . . The energy sector is the next cornerstone in ending the embargo. . . . [The U.S.] already receives] oil from Venezuela, . . . although that is a country that the United States also hasn’t been getting along with.” (Houston Chronicle, 2/4/06).

- “Greta Lichtenbaum, an attorney for the Washington firm of O’Melveny & Myers that focuses on regulations governing international business and trade, didn’t see how energy companies could get permission to do business with Cuba. ‘Barring regime change in Cuba, I can’t imagine why they would license such activity.’ . . . The U.S. Government approved a 2000 law that allowed food and agricultural products to be sold to Cuba . . . But Lichtenbaum notes there’s a difference between investing in Cuban oil production and sales of U.S. agricultural products. ‘An investment in Cuba would be a lot more controversial.’” (Houston Chronicle, 2/4/06)

- If oil in commercially viable volumes is found, Cuba could be transformed from an oil importer to an exporter, ending the country’s chronic energy shortages and filling the government’s coffers with much-needed revenue. Repsol-YPF has reported that it plans to spend more than \$40 million on the project, on the basis that up to 1.6 billion barrels could potentially lie under the seabed. (Source: NOIA).

- “U.S. corporations, however, have watched the activity less than 60 miles south of Florida’s coastline with their hands tied. U.S. oil exploration in Cuban waters—along with most U.S. trade—is prohibited under a 45-year-old U.S. embargo designed to undermine Fidel Castro’s communist government.” (Miami Herald, 2/2/06)

- The United States generally has the best deep water equipment, which are prohibited from being used due to the embargo. (Source: Publicly available company Web sites, publicly available CIA Data Book.)

Question 3. You mentioned that Dow Chemical was planning on building a large facility in Texas, but due to natural gas prices, the plant is now going to be built in Oman. Please provide more details, including the advantages of having this plant located in the United States (such as jobs, etc.) and the factors that contributed to this decision (such as natural gas prices in the United States versus Oman, plant siting requirements, etc.).

Response. Andrew Liveris, President and CEO of the Dow Chemical Company, testified before the Senate Energy and Natural Resources Committee on October 6, 2005 on the subject of high natural gas prices. He noted that high U.S. natural gas prices were affecting Dow's investment decisions. Specifically, he said that the U.S. price of natural gas, by far the highest in the world, had forced Dow to cancel plans to build a \$4 billion polyethylene complex and move the project to Oman. When completed, Mr. Liveris said, the project will employ 1,000 people in operations, engineering and research and development positions. As noted, chemical complexes create a large multiplier effect on communities. Every chemical industry job creates 5.5 additional jobs in businesses that service and supply the chemical complex. Locating chemical plants in other parts of the world creates fewer jobs for engineers and scientists thus weakening America's technical universities.

Question 4. You mentioned that one of the problems with sending all of these jobs overseas is the "brain drain" that it is causing on our competitiveness. What is the impact of all of these jobs lost in the chemical industry in terms of Nation's innovation?

Response. Experts in the field of developing new and innovative products will obviously follow the jobs, wherever they might be. If the companies are moving operations overseas and the product growth opportunities are occurring offshore, then it follows that the R&D experts will be located accordingly. Short term, this creates the brain drain and long term, it lessens the attractiveness for U.S. students to choose these career options as they have fewer job opportunities within the United States. These factors suggest that more and more of the new and innovative products will not be domestically developed.

Question 5. You mentioned in your testimony that your industry has lost over 100,000 jobs as energy prices undermined the global competitiveness of some chemical operations. What are the types of jobs that were lost and what can we do to bring them back?

Response. The chemical industry employs on average, the highest skilled workers in the country and these are high paying jobs. Every job in the industry adds about 5.5 jobs to the broader U.S. economy through both supplier and expenditure jobs. Unfortunately, the jobs lost are unlikely to come back. The intellectual capital also tends to relocate with the manufacturing facilities—offshore. So we are also losing the longer term science and technological leadership from this country as these individuals follow the opportunities elsewhere in the world. This is why it is so critical for Congress to act and restore balance and affordability to the natural gas market to stop this attrition on good paying U.S. jobs.

Question 6. You mentioned that demand destruction through shutdowns or curtailments by the industrial sector has been the means of achieving balance for natural gas. What would it take to avoid future demand destruction?

Response. More access to the Nation's energy supply and full utilization of the diversity of fuels we have available. A growing economy needs a growing supply of energy. It's that simple. Congress needs to free up the domestic supply of natural gas and support continued growth of nuclear coal and renewable energy sources. Demand destruction will continue as long as industry's that compete globally are priced out of the market by domestically driven demands on natural gas that can be passed along to the consumers. The attached white paper, prepared by ACC economists, details the cause and effect of industrial demand destruction.

STATEMENT OF THE AMERICAN FOREST & PAPER ASSOCIATION

INTRODUCTION

The American Forest & Paper Association (AF&PA) applauds the Subcommittee for recognizing the nexus between government policies and energy prices. For many years, Federal policies have encouraged increased consumption of clean burning natural gas to meet environmental objectives. At the same time, other Federal policies have restricted access to supplies of natural gas both on and offshore. This dichotomy has resulted in a serious supply demand imbalance with natural gas prices rising to record levels.

AF&PA is the national trade association of the forest, paper and wood products industry. Our organization represents approximately 250 member companies and related trade associations that grow, harvest, and process wood and wood fiber; manufacture pulp, paper and paperboard from both virgin and recycled fiber; and produce solid wood products.

The U.S. forest products industry is vital to the Nation's economy. We employ more than one million people and rank among the top 10 manufacturing employers in 42 States with an estimated payroll of more than \$60 billion. Sales of the paper and forest products industry top \$230 billion annually in the United States and export markets. We are the world's largest producer of forest products.

Energy is the third largest manufacturing cost for the forest products industry, making up 18 percent of total manufacturing costs for pulp and paper mills—up from 12 percent just 3 years ago. Annually, forest products companies purchase about 400 billion cubic feet of natural gas. While today the price of natural gas in the United States hovers around \$8 per million BTUs, in the last 3 months we have seen prices as high as \$15. That is an increase since July and four times historic averages. This increased price for natural gas has also put increased pressure on purchased electricity and the price of chemicals needed for our manufacturing operations. Higher natural gas prices have the additional effects of increased transportation costs, as pulp is sourced from around the world.

Meanwhile, prices in the rest of the world are noticeably lower. For example, the high cost of gas in the United States dwarfs gas prices in other countries that have seen much lower prices per million BTUs, such as South America, and Russia, putting our industry at a significant competitive disadvantage. This disadvantage is on top of other competitive disadvantages we face. Our taxes are higher than those of competing nations, and there are unfair trade barriers to the export of our products. The cost of compliance with our Nation's environmental laws is directionally higher than the cost for some of the countries with which we compete, and transportation costs are greater than anywhere else around the globe. Government restrictions are also limiting our access to fiber—even though our forestry stock has increased by 39 percent since 1952. If we cannot successfully address these challenges, the public demand for forest products will increasingly be filled by other nations who do not adhere to our high standards.

The impacts of rising energy prices on the industry have been dramatic. The forest products industry has closed over 232 mills and lost 182,000 jobs (12 percent of employment) since 2000 when energy prices started a steep rise. High energy costs contributed significantly to these closures/lay offs. Mills also have suffered supply curtailments.

Ultimately, an adequate supply of energy at a reasonable price is needed for vibrant economic growth and environmental protection. Long-term solutions are essential to addressing this critical problem; however, it is also important that short-term steps be taken to mitigate the impact currently being felt by manufacturers.

IMPACTS ON THE U.S. FOREST PRODUCTS INDUSTRY

Due to the already tight supply situation, the industry needs short-term regulatory relief as long as prices stay abnormally high. Fuel switching is a viable option, as well as ceasing the operation of non-essential gas-intensive controls at forest products facilities. However, these options are precluded at many facilities due to permit and other environmental requirements.

- Boise-Cascade says natural gas costs were behind a shift cut of about 70 jobs at its lumber mill in La Grande, Oregon for 2 months last fall. The sawmill uses gas-fired boilers to generate steam for drying lumber. Boise reported that the cost of natural gas has nearly doubled at the time, making it infeasible to operate the shift. Boise-Cascade is Union County's largest employer with 700 workers.

- A Pasadena Paper mill, the last paper mill in Houston, closed its mill in early October and blamed high natural gas prices for the decision. The mill employs 250 workers and has been in operation for more than 60 years.

Supply Curtailment

AF&PA members around the country report that supply and demand are delicately balanced, and companies from Wisconsin to Mississippi report curtailment problems—especially following the recent hurricanes.

Many companies operate with interruptible contracts to save money and allow natural gas to be diverted for high priority uses in the winter. The following examples illustrate the recent difficulties experienced with this type of curtailment.

More Frequent and Longer Shut Downs

- A Wisconsin company reported experiencing one to two interruptions during past heating periods, but during the 2004—2005 winter season, interruptions doubled to three to four shut downs. And the duration of each interruption was much longer—lasting up to seven or 8 days in some cases. The company is concerned about the coming winter and actively monitoring the situation.

- On September 28, a facility in Zachary, Louisiana was issued an administrative compliance order to cease use of natural gas because natural gas supplies were not available to the facility. If natural gas curtailment becomes necessary, it would be large industrial customers who lose natural gas first. Home heating and other key uses of natural gas will take precedence over uses by industry even if they technically have “non-interruptible contracts.”

Shrinking Supply/Increasing Prices

- An Alabama wood products facility with interruptible service was notified after Hurricane Rita that service would be interrupted for about 1 week. However, the facility was given the option of purchasing gas at the average daily market price. The price of gas for the facility rose from an already high value of \$10.99/MCF to a new high of \$19.79/MCF. And over the week, the facility spent an extra \$57,000 to meet its energy needs.

Ability to Switch Fuels Limited by Permits

In the face of higher natural gas prices and supply interruptions, temporarily switching to less expensive fuels is a very viable and necessary option for mills facing the economic challenge of paying utility bills and remaining profitable. However, this option is constrained by permit requirements:

Permits Limit Options

- Paper and wood products companies from Massachusetts to Tennessee and Georgia report that permits limit the burning of #6 fuel oil—the more reasonably priced fuel—to 60 or 90 days per year. Several companies report that they are nearing their limit for using #6 fuel oil, and if gas prices go higher, their only option is to close facilities. Clearly, permit waivers while prices are high would avoid this situation.

Faced with interruptions and exorbitant prices, companies have unpleasant options for continuing business. They can pay substantially more for available energy or shut down the facility. Neither solution is acceptable to the company or to the U.S. economy.

Majority of Gas Used for Emissions Control Units

Members operating wood products facilities report that the control unit required to remove emissions of volatile organic compounds (VOCs) consumes by far the majority of gas at the facility. As an industry, paper and wood products facilities combined use BCF of natural gas—approximately the amount needed to heat 90,000 homes—to fuel control units.

And the percentage of natural gas used to fuel control units is increasing as facilities improve energy efficiency elsewhere in the plant.

Emissions Control Consumes High Percent of Natural Gas

- Several companies report that VOC control units can consume from 50 to 99 percent of all natural gas used at wood products facilities.

With rising gas prices and interrupted supplies, the cost to remove emissions of volatile compounds—mostly methanol—is staggering.

Control requirements for these facilities were based on far different gas-price scenarios. At many facilities, the economic analysis used gas prices in the range of \$2–\$3/MCF. With gas prices of \$8–\$12/MCF, the results are dramatically different and call into question whether the controls should be required while prices are so high. The following two examples illustrate this point.

Wood Products Facility	Cost of VOC Removal (\$/Ton VOC Removed)	
	Time of Permitting	At \$12 gas
Door Finishing Facility, MS	\$532	\$20,000
Average Oriented Strand Board facility	\$1,500–12,000	\$3,000–36,000

VOC Control Units Facilitate Foreign Competition

In the south, companies are facing increased competition on some wood products from South American suppliers. With higher natural gas prices, companies estimate that it is the cost of operating the VOC control units that makes it feasible for foreign competitors to enter the market. The United States is the only country in the world to use these types of controls on wood product facilities. Skyrocketing gas prices exacerbate the problem.

VOC Control Costs Burden U.S. Manufacturers

- One company estimates that on average it costs \$1.25–\$1.75 million per year to operate a control unit at today’s gas prices. For a facility with three units—which is typical—total costs are on the order of \$3.75 to \$5.25 million per year.

I. RECOMMENDATIONS FOR SHORT TERM RELIEF AND ASSOCIATED SAVINGS

Manufacturers need immediate action to allow them to operate while prices stay high whether driven by increasing demand for winter heating or supply reductions caused by hurricanes. This action should include the ability: (1) to use other fuels in the face of natural gas curtailments or prohibitively expensive gas and (2) to temporarily cease operations of non-essential gas-intensive controls that primarily control emissions of methanol. Similarly, electric utilities use the most natural gas in terms of industry sectors and fuel switching could result in huge natural gas savings. Other short-term recommendations include more aggressive consumer conservation programs. Each is discussed below.

(1) *Fuel Switching at Forest Products Industry Facilities*

Recommendation

- EPA and States could use enforcement discretion to allow fuel switching during periods of supply disruptions or exorbitant prices. EPA should provide short-term waivers, variances, or temporary compliance orders to facilities during the current emergency exacerbated by Hurricanes Katrina and Rita.
- Clean Air Act new source review (NSR) requirements should not be imposed on facilities that switch fuel especially in emergency situations. EPA could issue guidance clarifying that NSR would allow units designed to burn alternative fuels to do so.
- Monitor and reconsider, where appropriate, pending regulatory requirements that have significant negative impacts on natural gas demand or supply.

Potential Savings

AF&PA has surveyed its members to determine the extent to which they could switch to alternative fuels if permit limits and regulatory constraints did not limit or prevent switching. In the survey, we specifically requested respondents to consider physical plant, pricing and other potential practical issues when answering. Our objective was to obtain an accurate estimate of the amount of fuel switching that actually could occur if the permit and regulatory constraints were removed.

Based on responses to our survey, it is clear that removing barriers to fuel switching could result in savings of significant amounts of natural gas and economic relief for industry mills. Specifically, responding mills producing pulp, paper, paperboard and paper products indicated potential savings of about 1 billion cubic feet per month. These savings represent approximately 4 percent of the monthly natural gas used by the industry. These mills would realize cost savings of almost \$6 million per month by switching to other fuels. These resources could be better spent on retaining high paying industry jobs or investing to make the mills more efficient and competitive.

We should note that these figures are based only on the responses we have obtained to date from our members. They likely understate the potential conservation of gas because the responding mills account for a small portion of the mills that make up the forest products industry.

(2) *Operations of Non-Essential Gas-Intensive Controls at Forest Products Industry Facilities*

The forest products industry operates some mandatory pollution controls that require considerable amounts of natural gas to operate, while producing questionable environmental benefits especially during cold weather months. Permit requirements mandating full time operation of regenerative thermal oxidizers (RTOs) serve as an example. Many of these RTOs are designed to burn primarily methanol emissions for ozone abatement, in part, even though methanol is not a major contributor to smog formation. In addition, ozone is not a pollutant of concern during the winter months, yet operating permits require year-round operation. For the forest products industry, RTOs consume about 10 billion cubic feet of natural gas annually at a cost of over \$100 million. Finally, these controls produce hundreds of tons of nitrogen oxide emissions that contribute to the ozone problem making the cure cause more harm to the environment. Therefore, mills should be permitted to cease operating these nonessential controls as the effect on public health would be negligible and substantial gas savings would result.

Recommendation

- EPA should allow amendments to current permits to address energy emergencies. At current gas prices of \$8–12/million BTUs, emissions controls are not cost effective.

Potential Savings

The wood products segment of the industry has the potential for the greatest savings from ceasing operation of non-essential gas intensive controls—approximately 7 billion cubic feet per year. With regard to the paper segment of the industry, potential savings are lower at approximately 2 billion cubic feet per year.

(3) Fuel Switching by Industrial Boilers

Recommendation and Savings

Today, only 5–10 percent of other industrial boilers are capable of fuel switching, down from 25 percent in the past. Nonetheless, due to the number of such boilers, potential savings could be as much as 0.2 trillion cubic feet per year. Again, this may be an optimistic estimate because there could be other, non-regulatory impediments to fuel switching for these boilers, such as the siting of fuel back up tanks. Nonetheless, due to the magnitude of potential savings, it is worth additional consideration and analysis.

(4) Continued Aggressive Energy Conservation Campaign

AF&PA supports the Administration's "Easy Ways to Save Energy" Campaign recently announced by Energy Secretary Bodman. The campaign includes actions directed at consumers, businesses and government agencies. We support the comprehensive nature of this campaign, with its recognition that all societal sectors must contribute to conservation efforts.

At least 10 AF&PA member mills have participated in an existing Department of Energy (DOE) energy saving program, which provided energy assessments for industrial facilities. On average, implementation of the assessments' recommendations has resulted in millions of dollars in savings per mill. DOE should continue and expand these and the other measures in the campaign.

(5) Better Compliance with Executive Order on Energy Impacts

The four regulations and policies discussed below are just a few examples of requirements that, depending on how they are implemented, can increase the demand for natural gas, and therefore increase the upward pressure on prices. EPA and other Federal agencies should work with the Office of Management and Budget (OMB) to ensure rigorous compliance with Executive Order 13211 (Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use) to clearly identify regulations that are significant energy actions and to require robust, detailed analysis of the effects regulatory actions will have on natural gas supply, use and price. This will allow Congress and the Nation to have an informed discussion about policies increasing natural gas demand.

1. *PM fine Implementation rule (final in mid-2006).*—A number of improvements can be made to EPA's proposed rule to increase compliance flexibility in State Implementation Plans (SIPs) that are due in 2008. Failure to find cost effective reductions or take credit for the significant reductions under the Clean Air Interstate Rule (CAIR) will lead to additional regulatory pressures on manufacturing and utilities to reduce NO_x and SO₂. On the margin, some facilities may choose to switch to natural gas rather than fit facilities with expensive add-on controls. New units especially will be driven to use natural gas given a lack of sufficient "emission credits" to use coal or other fuels.

2. *Ozone implementation proposal (proposal 2006).*—EPA should maximize State flexibility to implement the new 8-hour ozone rule. Failure to take into account reductions from existing programs could push States to control Volatile Organic Compounds (VOCs) through gas-intensive incinerators which also produce hundreds of tons of NO_x and require additional NO_x reduction that will occur as a result of CAIR and other programs.

3. *Industrial Boiler review (fall 2006).*—Under the Air Quality Management recommendations, EPA is examining the need for additional national controls on industrial boilers. We are concerned that tighter controls on a wide variety of boilers will prompt further fuel switching to natural gas if controls are expensive or infeasible. EPA should not set national criteria pollutant standards for boilers since this approach was recently rejected as part of CAIR and remaining air quality problems are more localized and not national in scope. Finally, boilers differ substantially across industries in terms of fuels, size, uses, and designs so a one-size-fits-all national regulatory approach is not justified.

4. *Trading as a Viable Compliance option under the Clean Air Act (first half of 2006).*—EPA has embraced trading in the Acid Rain and CAIR programs. However, the opportunities for other sources, especially in the manufacturing sector to participate in such programs have been limited to date (i.e., NOx SIP call). EPA should develop a model trading rule for States to adopt for industrial sources as a viable and more cost effective option for complying with Best Available Retrofit Technology (BART) and the regional haze program in general as well as for implementing the new PM fine and ozone NAAQS. Trading programs should be integrated with existing programs to the extent possible.

II. RECOMMENDATIONS FOR LONG-TERM BALANCE OF SUPPLY AND DEMAND

An adequate supply of energy at a reasonable price is needed for vibrant economic growth. Long-term solutions are essential to addressing this critical problem. Ultimately, we believe that balance can only be achieved if action is taken in each of the following critical areas:

(1) *Remove Barriers to Supply of Natural Gas*

OCS

Remove Federal restrictions currently limiting access to deep-water offshore natural gas resources in the Pacific, Atlantic, and Eastern Gulf of Mexico Outer Continental Shelf (OCS). AF&PA supports H.R. 4318 The Outer Continental Shelf Natural Gas Relief Act of 2005, a bill introduced by Representatives Peterson and Abercrombie that would lift restriction on natural gas leasing in the OCS.

The National Petroleum Council estimates that there are approximately 300 TCF of natural gas and more than 50 billion barrels of oil on the OCS off the continental United States that can be recovered using existing technology but which have yet to be discovered. This is enough natural gas to maintain current OCS production for almost 70 years and enough oil to maintain current U.S. oil production for more than 80 years.

- *Lease 181.*—Lease 181 might represent 20 percent of the entire Gulf gas production for the next 6 years; it is an immediate source of supply because the pipeline infrastructure necessary to transport the gas to market is already built and operational in the area. Congress and the Administration should take immediate actions to expedite the sale of the lease 181 area.

- *State Empowerment.*—Senator Lamar Alexander’s “Natural Gas Price Reduction Act of 2005,” (S. 726) and Subtitle E (Chairman Richard Pombo’s Ocean State Options Act) of the House Resources Committee’s budget reconciliation package, provide a workable framework for allowing States to pursue deep water energy production off their shores.

- *Liquefied Natural Gas (LNG).*—LNG is becoming more affordable and practical with recent advances in liquefaction and transportation technology. However, barriers to LNG in the Natural Gas Act and FERC regulations and difficulties in siting new or expanded facilities will make it a challenge for the Nation to realize significant increased natural gas supply through increased LNG use. The provisions in the Act to expedite LNG siting and expansion should be aggressively implemented.

- *Generation Efficiency.*—Industrial consumers of natural gas have improved significantly the efficiency with which they use natural gas because of the pressures of global competition. Utilities, however, are not subject to the same competitive forces and have not updated the efficiency of older power plants, in most cases simply passing through to their consumers the increased cost of natural gas. Congress and the Administration should adopt and support policies that will encourage or require all public utilities to meet a generation efficiency standard for their natural gas-fired generation units.

- *Alaska Natural Gas Pipelines.*—The Alaska Natural Gas Pipeline will provide 1.5–2.2 TCF per year that could reach the lower 48 States after 2015. Efforts should be undertaken to expedite the completion of the pipeline.

- *Unconventional Sources of Natural Gas.*—Congress and the Administration should encourage and provide incentives for new technologies to find and tap supplies of unconventional sources of gas. The United States already obtains 7 TCF of natural gas a year from unconventional sources, and the EIA projects that production of unconventional gas can be increased by 1.2 TCF within the next 10 years.

- *Efficient Permitting.*—The oil and gas reserves on Federal lands should play a critical role in the Nation’s energy supply. Congress recognized the impediments to efficient exploration and development of these resources (as well as the OCS) in the Act by directing the Department of the Interior to improve its practices and conduct various pilot projects on more efficient processing of access applications. The Admin-

istration and the Congress should fully fund the permitting programs to eliminate the backlog of permitting and expand the pilot project if it proves to be successful.

(2) Diversify the Nation's Energy Portfolio through R&D and Incentives

- *Renewable Energy.*—Biomass energy is renewable, and is “carbon neutral.” DOE should strongly support the Agenda 2020 program, a key component of which is the Integrated Forest Products Biorefinery (IFPB), a technology platform that includes biomass gasification technologies. The IFPB technologies will give industry the ability to make greater use of renewable biomass energy in its processes, while becoming a net producer of renewable electric power, liquid transportation fuels, and other biobased energy and products. If fully developed and commercialized, the IFPB technologies could produce enormous energy and environmental benefits for the industry and the Nation both, including contributing to a diversified and secure national energy supply.

- *Coal.*—In the United States, coal is the lowest cost and most abundant domestic energy resource; coal fuels more than 50 percent of U.S. electricity. AF&PA supports the Administration's FutureGen coal initiative that will spend \$1 billion over 10 years. The initiative will build the world's first zero-emissions fossil fuel plant combining several promising technologies to enhance the efficiency and reduce the environmental impacts and greenhouse gas emissions from coal. The Administration should also aggressively implement the “Clean Coal” provisions in the Act and adopt other policies to encourage deployment of this technology and use of coal as an energy source for the Nation.

Conservation

Over the long term, energy conservation programs can yield impressive energy savings and Congress and the Administration should aggressively fund and continue energy conservation campaigns.

CONCLUSION

We urge the subcommittee to support policies that will address the fundamental imbalance in natural gas supply for both the short term and the long term. Our Nation's economic growth and the ability of U.S. manufacturers to regain their competitiveness can be greatly enhanced by implementation of a strong and balanced energy policy that will reduce natural gas costs for all consumers.

