NATURAL GAS SUPPLY AND DEMAND ISSUES

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NATURAL GAS SUPPLY AND DEMAND ISSUES

TUESDAY, JUNE 10, 2003

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

The committee met, pursuant to notice, at 10:06 a.m., in room 2123, Rayburn House Office Building, Hon. W.J. "Billy" Tauzin (chairman) presiding.

Members present: Representatives Tauzin, Bilirakis, Barton, Upton, Stearns, Gillmor, Deal, Whitfield, Shimkus, Shadegg, Buyer, Radanovich, Bass, Bono, Walden, Terry, Rogers, Otter, Dingell, Markey, Hall, Boucher, Deutsch, Stupak, Wynn, Green, McCarthy, Strickland, DeGette, Capps, John, Allen, Davis, and Solis.

Staff present: Bill Cooper, majority counsel; Andy Black, policy coordinator; Peter Kielty, legislative clerk; Sue Sheridan, minority counsel; and Bruce Harris, minority professional staff member.

Chairman TAUZIN. The committee will please come to order. Without objection, the committee will proceed pursuant to committee rule 4(e). It is so ordered.

The Chair recognizes himself for an opening statement.

Today's hearing is entitled "Natural Gas Supply and Demand Issues." It sounds like the title of a chapter in an economics textbook, I am sure, but in an academics setting, that topic would probably put people to sleep. However, in this real world of running air conditioners to cool homes in the summer or running furnaces to heat homes in the winter and running factories to make products necessary for the 21st century for our economy to grow and to prosper, natural gas supply and demand is a hotly debated topic today.

The seriousness of the topic is underscored by the level of nervousness exhibited by those dealings in the natural gas industry on a daily basis.

Demand for natural gas is ever-increasing. Nearly 23 percent of the United States' primary energy requirements are fulfilled by natural gas. Oil accounts for about 39 percent and coal represents 22 percent. Total natural gas consumption is expected to increase from the current rate of 21.6 trillion cubic feet per year to 35 trillion cubic feet by the year 2055.

Natural gas has been advocated for a myriad of uses ranging from fuel for automobiles to fuel for electric power generators to fuel for heating homes to fuel for charcoal grills even. And for years we have all seen and read the advertisements saying that natural gas is the cleanest fossil fuel—environmentally friendly, produced domestically, and available in abundant supplies. But now we are

hearing a different story. Natural gas production is flat and has been flat since the year 1994. As drilling and production technologies improved, declining rates for natural gas wells are climbing right now, which means wells are being depleted at faster rates.

For instance, in 1990, the average decline rate was 17 percent. In 2003, it is estimated that the decline rate is now 28 percent.

Technology plays an important role in the industry's ability to produce faster and faster. However, the industry is drilling for smaller and smaller reservoirs, and consequently huge reservoirs with long life spans are not now being drilled.

Is this a subversive plot by energy companies to deprive the Nation of much-needed natural gas and to drive up the price? The answer clearly is "no." Drilling companies are at work everywhere they are allowed to go. The problem is, huge areas of potential natural gas reserves are off limits because the Federal Government prohibits drilling activities on vast areas of lands that are now owned by the Federal Government.

Less than 50 percent of the undiscovered gas resources on Federal public lands is now available for leasing; yet one of the difficult battles we had in passing H.R. 6 was an amendment to strip out an inventory of oil and gas resources on lands owned by the Federal Government. So drilling companies are doing the best they can with what they have to provide natural gas to a consuming public that desperately needs it.

The Chairman of the Federal Reserve Board, Alan Greenspan, who will be with us later today, I think at 2 o'clock, hit the nail on the head when he said that we have a contradictory Federal policy concerning natural gas. On the one hand, the Federal Government encourages the use of natural gas for a whole host of processes. On the other hand, the Federal Government restricts more and more public land to natural gas development. So the Federal Government is the not so invisible hand in the marketplace increasing demand, and all the while decreasing supply.

Yet, talk about market manipulation. To quote Mr. Greenspan, and this is his quote, "And if on the one hand we have encouraged, as we have, very significant growth and domestic demand for natural gas, but are very readily constrained by our ability to increase supply, then something has got to give."

And what is giving, of course, is price. Price affects everybody, from the well hand to the burner chip.

High natural gas prices are having an adverse impact on this economy. It is bad enough that our industries must battle foreign products that are unfairly advantaged by foreign governments such as the Russian nitrogen fertilizer industry. Our government should not punish industries relying heavily on natural gas by restricting access to supply.

If a train wreck occurs and natural gas prices skyrocket and shortages occur, who will be at fault? Will it be the producer, the consumer, or perhaps the Federal Government? Well, the bottom line is, the reason we are having this hearing today is, we see a storm brewing on the horizon, and we need to prepare for it.

I look forward to hearing the testimony from the witnesses today, on this topic which is so critically important not only to industries

and economists, but to every single American who is now struggling to make ends meet, and to all of us who are hoping that Americans can go back to work and this economy can recover instead of going through another shock.

And the Chair yields back the balance of his time and seeks members interested in opening statements.

Mr. Boucher is recognized for an opening statement.

Mr. BOUCHER. Thank you very much, Mr. Chairman. I want to commend you for convening today's hearing on natural gas supply and demand concerns. The topic is very timely, given the vital importance of natural gas to our Nation's energy portfolio and to our entire national economy.

Currently, 23 percent of the United States primary energy requirements, including industrial, residential, commercial, and electric utility sectors, are met through the use of natural gas. According to the Energy Information Administration, the Nation's use of natural gas is expected to increase to 52 percent by the year 2025.

In recent years, natural gas has proven to be the fuel of choice for electric utilities building new electricity generating units. This trend is expected to continue, with an estimated 10.4 trillion cubic feet of gas consumption by electricity generators predicted by the year 2025. And that is up from 5.3 trillion cubic feet in the year 2001.

In addition, the Energy Information Administration estimates that domestic gas production is expected to increase more slowly than consumption during the same period of time.

Along with the increased usage of natural gas, there has been an increase in price volatility and cyclical decreases in storage inventories. In January of 2001, natural gas prices peaked at nearly $9 per million BTUs. Current prices range between $5 and $6 per million BTUs, and natural gas inventories are at the present time below historic averages.

Given the recent and projected increases in natural gas consumption, the many concerns regarding the availability of enough natural gas to meet demand, the price volatility which has been evident in recent years and which, given the current projections, we can expect to continue over time; in concerns related to inventory levels, natural gas usage is among the most critical energy policy questions that face this committee today.

Natural gas certainly has many benefits, ranging from environmental compatibility to the comparatively low capital costs associated with starting a new gas-fired electric generating facility. However, our Nation has a number of energy alternatives. I would note, for example, that coal remains the Nation's largest domestic energy resource with reserves estimated for an additional 250 years.

In addition, advances in clean-coal technologies, both recent and on the horizon, are ensuring that future coal-fired electricity plants will be able to operate with little environmental effect. Ensuring that fuels other than natural gas, including coal, play a larger role in meeting future energy needs will help to keep natural gas prices affordable for the utilities, for the residential users, and for the industrial consumers who depend upon natural gas.

I look forward to the witnesses' testimony before us today, and I want to thank them for preparing remarks and taking time to

join us here. The topic they are addressing, the current state of natural gas supply and demand, is truly timely. I welcome their recommendations with respect to policies that will ensure that this Nation does not reach a natural gas crisis.

I thank you very much, Mr. Chairman, for holding this hearing, and I yield back.

Chairman TAUZIN. I thank my friend.

And the Chair asks, further requests for opening statements? The chairman of the Subcommittee on Energy, Mr. Barton, is recognized for an opening statement.

Mr. BARTON. Thank you, Mr. Chairman, for holding this important hearing today. I appreciate your offer to conduct the hearing at the full committee level after we learned that Chairman Alan Greenspan would be willing to testify if it was a full committee hearing instead of a subcommittee hearing. The participation with Chairman Greenspan underscores the significance of the issue that's before the committee.

Our Nation faces both a short-term and a long-term future of high natural gas prices. It is my understanding that natural gas prices at the wellhead today are over $6 in MCF. Many Americans are dependent upon affordable natural gas prices for their residential heating, the electricity the power companies sends them, many products that they use, and perhaps even their job. Today, we call the Nation's attention to the problems of a steady increase in natural gas demand and a staggering or slow-growing natural gas supply.

The witnesses before us represent natural gas producers, consumers, analysts, and infrastructure experts. I expect that we will hear that little can be done to reduce demand in the short term. Therefore, we must try to do something to improve the supply.

The hearing today is timed perfectly for a number of reasons, Mr. Chairman. First, decisions that are made today by market participants will determine the amount of natural gas stored in inventory for the coming winter. If this winter is as cold as last winter was, many people expect surprisingly high prices.

Second, the U.S. Senate this week is trying to complete work on its energy bill. I would encourage all the Members of the Senate to work together for whatever time agreements are necessary to get the energy bill done so that we can go to conference between the House and the Senate. As you well know, we passed our House energy bill several months ago.

The energy bill is not an inside-the-Beltway bill, because it does affect real people. As we will hear today, energy affects all Americans and needs the attention of Congress. The House has acted, passing legislation that will do its part to address the problem. I know in the Senate it is often easier to slow things down than to speed things up, but I would hope that this hearing today would encourage our Senators on both sides of the aisle to try to work together for the Nation's energy business.

The third reason that today's hearing is well-timed is that proponents of regulating carbon dioxide either as a pollutant or through some other mechanism needs to consider what added fuel switching would do to our natural markets and to our consumers. I strongly believe that our Nation should continue to have a broad

portfolio of fuel choices, that coal should continue to play a leading role in electric power generation. The thing to do with coal burning is to improve it, not to reduce it.

Next week, on June 17, my subcommittee, the Energy and Air Quality Subcommittee, will hold a hearing on the future options for generation of electricity from coal. Witnesses will discuss clean-coal technologies and new applications, like coal gasification, advanced combustion boilers, the Department of Energy future program, and other possibilities to have coal burn more cleanly, yet still play its vital role for Americans.

Today, the focus of the natural gas supply and demand is before the full committee. Congress needs to hear just what the problems are and what the possible solutions are. We need to know about the investment climate that dictates whether someone does or does not want to invest in natural gas production. We need to hear what it will take to get private parties to build the Alaska natural gas pipeline, which will help but not by itself solve the supply and demand imbalance. And last but not least, Americans need to know what is facing us down the road in terms of natural gas.

Mr. Chairman, I want to again thank you for holding today's hearing at the full committee; and as always, thank you for your leadership on energy issues.

Chairman TAUZIN. I thank the gentleman.

Mr. Green? Does Mr. Green seek recognition for an opening statement?

I see Mr. Dingell is here. My apologies. Mr. Dingell, the ranking Democrat of our committee, is recognized for an opening statement if he wishes to give one.

Mr. DINGELL. Mr. Chairman, I do.

Chairman TAUZIN. The gentleman is recognized.

Mr. DINGELL. And I thank you.

Mr. Chairman, thank you for holding this hearing on natural gas supply and demand. After years of relatively low natural gas costs, consumers in Michigan and other parts of the country have experienced wide price swings in recent years. In January 2001, gas peaked at nearly $9 per million BTU. One year later, prices are running $3 per BTU. But by January 2003, they crested again at nearly $8 million per BTU—or rather, nearly $8 per million BTU.

These fluctuations make budgeting for energy use difficult for both residential and industrial consumers.

Currently, gas is about $6 per million BTU and predicted to stay at least at that high level for the foreseeable future. Chairman Greenspan has noted with concern that these prices seem out of kilter with moderating prices for oil and gasoline in recent months. Secretary of Energy Abraham recently noted that natural gas working storage levels are 42 percent below the previous 5-year average, and that hot summer weather could hinder efforts to refill these inventories. In the event the storage levels remain low into the winter heating season, consumers could once again face skyrocketing prices.

While Congress has attempted to deal with natural gas supply issues in the past, the wrinkle that makes this particularly difficult today is that the Nation has become highly dependent on natural gas for various uses that higher prices reverberate even more

broadly throughout our economy. Most of the new electric generating capacity added in recent years is fueled by natural gas, so that when prices rise, it is felt not only in the homes that use natural gas directly, but also those that use electricity made from gas. Moreover, electric consumers in many parts of the country, particularly the Western States, have had more than their fair share of volatility in their utility bills. Since a number of industries depend also on natural gas directly or indirectly, the Nation's economic recovery could be jeopardized by a prolonged period of high prices.

Unfortunately, it is easier to comment on the nature of the problem than to come up with solutions. If Congress enacts comprehensive energy legislation, provisions to encourage greater conservation and energy efficiency may provide some relief, but not in the short run.

I am interested in suggestions from our witnesses regarding what can be done to prevent consumer hardship next winter. I know Secretary Abraham has called on the industry to come up with ideas along these lines, and perhaps some of those are gelling. Members of the committee led successful efforts in 1987 to repeal most of the restrictions on natural gas use of the Power Plant Industrial Fuel Use Act of 1978. I would be interested if our current committee members have the same or a different opinion.

With that, I wish to extend a special welcome to Carl English from Consumers Energy. That is a company that provides great service to Michigan consumers, and I am glad he will be with us today and look forward to his testimony.

I also look forward to Chairman Greenspan's testimony and recommendations.

Mr. Chairman, I thank you and my colleagues for your attention.

Chairman TAUZIN. I thank my friend.

Are there further requests for opening statements on this side? The gentleman from Florida, Mr. Stearns, seeks recognition for an opening statement?

Mr. STEARNS. Yes. Thank you, Mr. Chairman.

Chairman TAUZIN. The gentleman is recognized.

Mr. STEARNS. I think we have had many hearings here in which we have talked about the growing gap between natural gas supply and demand. This is my 15th year in Congress, and I have been in many hearings like this.

I applaud the Chairman for having this hearing. It is a long-term problem. We are not going to expect to solve it today or in the very near future, but I think one of the things that is coming across my way of thinking is that the U.S. Government, the States, and local municipalities own a lot of land; and I think Congress would help the situation if we went ahead and sort of deregulated and allowed private industry to develop the gas that might be in this Federal, State, and local land. That would be one area where a regulatory framework could be set up, established, and encouraged so that in a cost-efficient manner we could explore this opportunity for gas in these, I think, a lot of resource-rich Federal lands.

So, Mr. Chairman, I think that is one thing that we as a legislative body could do. And I applaud you for this hearing, and I hope that the witnesses will confirm some other things that we can do.

In Florida, it appears that in the foreseeable future our demand for gas is going to double, and we don't really have any opportunity to develop gas in the State of Florida, so we get—all of our gas is imported, so it is extremely important that even Florida look within its land territory for some type of way to develop some of this resource-rich Federal land.

So I thank you, Mr. Chairman. I look forward to the witnesses.

Chairman TAUZIN. I thank my friend.

The Chair asks Mr. Green if he seeks recognition. He does. And the Chair recognizes the gentleman from Texas, Mr. Green, for an opening statement.

Mr. GREEN. Thank you, Mr. Chairman. And following my good friend from Florida, there are some gas resources off the State of Florida, but our committee has taken them off the production list.

But I appreciate the opportunity for the chairman to have this, like my colleague from Florida, because just like Florida, all of our States are experiencing high natural gas prices. I feel strongly we must do everything in our power to raise the awareness of the natural gas crisis in our country, especially with our fellow colleagues in Congress. Consumers across the country are hit by high natural gas prices in the summer and the winter. Gas is a familiar fuel for furnaces in the northern part of our country, but 40 percent of the new power generation is being fired by natural gas. Consumers will increasingly feel the bite of gas prices in their power bills also.

Over the last two decades, since the deregulation of the natural gas industry, we have gotten used to fluctuating prices, typically about $2 per million cubic feet. And those prices have been over $3 for almost all of the last 2 years and over $4 since last January. Now, it is close to $6.50 per million cubic feet.

Experts predict steady U.S. demand growth for natural gas through the year 2030 and slowing declining domestic production, and that is a formula for high prices. This issue is of paramount importance to my constituents in the State of Texas because the natural gas crisis threatens the lifeblood of Texas Gulf Coast industry, petrochemical production. This industry is one of Texas' largest employers, and many of these jobs are in danger of being lost forever.

Without reliable, affordable natural gas, plastics and other petrochemical products now made in America will be produced overseas. And I would point out that the chemical and petrochemical industry is one field of manufacturing where America is still a net exporter. As policymakers, we must first take a serious look at the obstacles to domestic gas production, restricted public lands onshore and offshore, irrational pipeline regulation, and politically motivated moves to open up long-term energy contracts and to cap prices.

Most coastal States and their Washington delegations that have lots of new gas-fired power plants refuse to allow gas production offshore. The House energy bill in its current form does not even allow the Federal Government to study its own offshore reserves.

Second, we need to ensure that we have a healthy mix of energy sources. Cleaner coal technology, responsible nuclear power, both have important roles to play. However, natural gas will continue to be a popular choice because of the few negative consequences. It

burns clean, improves air quality, and plants will come to become more efficient. Liquefied natural gas technology, which allows us to tap abundant global resources, is also improving. But there is a serious not-in-my-backyard problem with the location of LNG terminals that will need to be addressed if we want gas-fired plants. With a break-even point near $2.50 per MCF, we need to take a hard look at LNG.

I look forward to hearing some of the solutions from our panelists this morning. I look forward to Chairman Greenspan's testimony this afternoon, which hopefully will motivate my colleagues to take action on this issue.

And again, Mr. Chairman, thank you for calling this hearing.

Chairman TAUZIN. I thank my friend from Texas.

Further requests for opening statements on this side? Mr. Whitfield, waives? Mr. Rogers, waives?

On this side, the gentlelady from California, Mrs. Capps, seeks recognition for an opening statement, and is so recognized.

Mrs. CAPPS. Thank you for recognizing me, Mr. Chairman, and for holding this hearing.

Ensuring we have adequate supplies of energy is critically important to our economy and our Nation's well-being. And some of the information we will hear today about natural gas supplies is disturbing, as natural gas has become a critical part of our energy stream and has allowed us to reduce polluting emissions. So it is good we are holding this hearing.

Mr. Chairman, attaining energy independence and predictability of supplies are some of the best reasons to enact a national energy policy. Our country should explore and extract oil, gas, and coal wherever it is economically feasible and environmentally sensitive. But first we should also adopt strategies for reducing our demand for energy. Simply drilling for more oil and gas anywhere we can find it is a fool's errand. We really should start by managing our consumption better.

In addition, we must have tough regulatory policies in place to prevent the blatant manipulation of energy markets, like what happened in California, when trading tricks and faked shortages drove prices through the roof and stole billions of dollars from California residents.

Unfortunately, the House energy bill fell woefully short of achieving these goals and establishing a rational, forward-looking national energy policy. Comprised mainly of subsidizing the oil, gas, coal, and nuclear industries, weakening environmental protections and lacking aggressive actions to reduce energy consumption, the bill is a classic missed opportunity.

For example, we should have adopted Representative Pallone's common-sense proposal to establish a renewable portfolio standard for power plants, to encourage them to use more renewable energy. This would lessen our dependence on fossil fuels; and it is clearly doable, since California companies are already doing it.

I do, however, want to point to one positive step the House took, and this has already been mentioned today: the adoption of a bipartisan amendment that I offered with my colleagues from Florida, Representative Davis, who is also a member of this committee, and Representative Jeff Miller. Our amendment removed from the

bill an extremely ill-advised provision added by the Resources Committee that would inventory the oil and gas resources off our coast.

Taking inventory sounds pretty innocuous, but this is not CVS, and the inventory isn't about counting toothbrushes. The inventory would actually undermine the long-standing national consensus, and two decades of executive and congressional action against new oil and gas drilling off some of our economically valuable and environmentally precious coastlines. And since we pretty much know where the vast majority of economically extractable oil and gas is—in the central and western Gulf, which are open to drilling—the inventory proposal is a thinly disguised attempt to drill off Florida, California, Massachusetts, and anywhere else with a beach. I am pleased that the House acted to check the irresponsible actions of the Resources Committee.

Clearly, we must have a vibrant energy extraction industry, but we have to do it in a way that is compatible with our national goal to protect our environment and coastal economies. And our energy policy is lacking if we don't first look at how to reduce our consumption of nonrenewable sources.

So I welcome the testimony of our witnesses, and I hope that this current difficulty in matching natural gas supply and demand is not seen as an easy excuse to push for more oil drilling and gas drilling off our coasts.

I yield back the balance of my time.

Chairman TAUZIN. I thank the gentlelady.

Further requests for time on this side? Mr. Stupak seeks recognition?

Mr. STUPAK. I waive.

Chairman TAUZIN. Waives.

Anyone else? I see Mr. Davis. Mr. Davis seeks recognition and is so recognized.

Mr. DAVIS. Thank you, Mr. Chairman. Thank you for holding this hearing.

I wish we had had a chance for a more thoughtful discussion on this issue during the course of the energy bill debate. I simply wanted to ask your consent to enter into the record a policy report just recently prepared by Chuck Alston of the Progressive Policy Institute, which I think represents an attempt to define how we can balance some of the environmental sensitivities Representative Capps referred to with legitimate concerns about supply.

Chairman TAUZIN. Without objection, the gentleman's request is granted, and the record will reflect the document. The gentleman may proceed. Is that all the gentleman had?

Mr. DAVIS. That is all.

[The report is available at www.ppionline.org]

Chairman TAUZIN. The Chair asks, is there further request for time?

The gentlelady Ms. Solis requests time. Ms. Solis is recognized for an opening statement.

Ms. SOLIS. Thank you, Mr. Chairman.

Good morning. I'm also pleased to be here and very anxious to hear from our witnesses today. I want to commend you, Mr. Chairman, and also Ranking Member Dingell for bringing this important matter to this committee's attention. And I am sure we will learn

quite a bit about this vital natural resource and its implications for our economy.

There is no doubt that natural gas will play a vital role in a cleaner energy future. As the least polluting fossil fuel, natural gas will play a central role when we finally get serious about reducing our greenhouse gas emissions.

Natural gas can and should play a great role in our transportation alternatives. In my home State of California, for example, we desperately need to speed the transition to cleaner natural gas school buses to protect the health of our school children in our communities. These new applications will increase demand for natural gas, and this will have the potential to drive up prices. Keeping natural gas affordable will require a renewed commitment to conservation and renewable fuels as well as seeking new supplies of natural gas.

There are some who would sacrifice environmental protections in a rush to develop new natural gas resources. I don't believe that in seeking solutions to one environmental problem we should create another.

It has been said, for example, that environmental laws effectively lock up much of our public land from natural gas exploration. In fact, the administration's own data show that this claim is simply not true. A study conducted by the Department of Interior surveyed five Western basins that contain the bulk of natural gas resources on U.S. public lands, and show that 12 percent of these lands were restricted for natural gas development. Even this low number is greatly inflated by the inclusion of major natural parks and wilderness areas in the study.

Americans overwhelmingly believe these areas should be off limits to resource extraction. California's famous Gold Rush created a contradictory legacy of economic opportunity and environmental destruction that we are still paying for today. The natural gas gold rush will also create a potential for economic prosperity and certainly environmental challenges. We would be wise to proceed thoughtfully and thoroughly as we consider our energy future.

In that regard, I hope that future hearings on this matter will feature analysts who can speak on both the environmental promise and potential for damage in increasing the use of natural gas in our energy portfolio.

I yield back the balance of my time.

Chairman TAUZIN. The gentlelady yields back.

Are there further requests for opening statements?

The gentleman, Mr. Markey.

Mr. MARKEY. Do I have to make the motion to waive my opening statement?

Chairman TAUZIN. Actually, let me do this; en bloc, I think, will help. Under the rule—let me explain to the audience what we are doing.

Under our new rules, if a member seeks time for an opening statement, he may give an opening statement. If he waives an opening statement affirmatively, that member is entitled to a little bit longer time in questioning. It is kind of an inducement so we can get to you quicker.

And I will make the en bloc request of all members who have waived their opening statement that they be permitted under the rule the benefits of the rule. Is there any objection? Without objection, so ordered.

The Chair will now welcome our guests, the first panel this morning. As I pointed out, we will have Alan Greenspan at 2 o'clock, but we have a distinguished panel of individuals who can indeed tell us a lot about this issue and inform us as to many of the questions I know that the committee will have.

First of all, Mr. Guy Caruso is Administrator of the Energy Information Agency.

Excuse me. Before I introduce the panel, do you seek recognition, sir, for an opening statement?

Mr. HALL. Mr. Chairman, if I can make a very important opening statement.

Chairman TAUZIN. On behalf of Texas, I assume.

Mr. HALL. Right.

Chairman TAUZIN. The gentleman is recognized for that purpose.

Mr. HALL. The Fourth District oil patch in particular.

Chairman TAUZIN. The gentleman is recognized.

Mr. HALL. Mr. Chairman, thank you, and members of the committee. And I am sorry to be late.

We have come almost full circle in my time in Congress and my time on this committee from a time of natural gas scarcity to the plentiful supply of natural gas back to a time of scarcity. The signs have been ominous for several years, yet we have chosen to ignore them, much like driving a car until the tank is nearly dry and then starting to look for a service station. Except, in this case, there is no real active service station on the block.

Then, as now, we talk about a scarcity when there really isn't one, only a lack of available supply. What is really scarce is the easy-to-find-and-produce natural gas. That gas is rapidly being depleted, but the hard-to-find-and-produce gas is not being brought on quickly enough to replace what we are using.

U.S. natural gas production has been virtually flat for the last decade. The EIA reported that the production declined in 2002. And even though the rig count is rising again, EIA is very cautious in its predictions of any significant production increase.

A lot of the resource is still underground, onshore and off our coasts, but I think we have to be smarter and have better tools to find and produce this gas. When ANWR fell by the wayside in Senate the last time, toward the end of the session, I called Boone Pickens and told him. I said, well, they knocked ANWAR out. He said, That is okay; it will still be there. It will always be there.

So we have got a supply, but it is still down in the ground. And kind of like my preacher at home told us, he had good news and bad news for us. He said, the good news is, There is enough in church right now to pay off the entire church debt; and the bad news is, It is still in you-all's pockets. That is kind of the way we are on the production of gas.

Much to its credit, several years ago the Department of Energy identified this problem and produced a road map for drilling and producing the gas that lies in the ultra-deep waters in the Gulf of Mexico in water depths in excess of 5,500 feet. According to a Uni-

versity of Texas Bureau of Economic Geology study completed in 2000, as much as 69 trillion cubic feet of incremental or additional natural gas can be produced from the deep waters of the Gulf and from unconventional onshore gas reserves if advanced technologies are used and deployed.

The revenues to the Federal Government from production on Federal waters and onshore Federal lands could be as high as 22 billion between now and the year 2015 at a cost to the Federal Government of about 3 billion. That is a good deal in anybody's books. These are incredibly compelling reasons to make a full-scale assault on developing these technologies on a crash basis and bringing this gas to our doorsteps sooner rather than later.

But, Mr. Chairman, let me be clear. We will never be able to produce as much gas as we have in the past. Peak annual production occurred in the early 1970's. However, we can slowly and surely and greatly slow the rate of decline in our domestic production. We need to take the pressure off of natural gas to meet some of the incredible demand that is projected by the Energy Information Administration and others' pressure, I might add, that is driven largely by Federal policy, namely, clean air and some other things, forcing people to use natural gas and not coal.

We need to use our most abundant resource, coal, but we also need to develop the technology that is necessary to burn coal with as few emissions as possible. We need to spend more on renewables—where it works, solar, and geothermal where it is available. And, of course, there is still much more to do in conservation, unless we use less of what we have.

I have a bill and a part of a bill that passed the Science Committee. Well, as a matter of fact, the first bill I passed in Congress in 1981 or 1982, when I came here, was a conservation bill that RCS and CACS and, Mr. Chairman and Mr. Markey, you well remember though.

We simply no longer have the luxury of engaging in fights over coal versus gas versus renewables. We need all of them, and we need them now to take some of the demand pressure off of natural gas.

Last year, I introduced legislation not only to establish an industry-led offshore program to bring these technologies into reality, but also to develop the technologies that will enable us to produce the hard-to-find gas onshore, too. These provisions were contained in the energy bill and were ready to be adopted by conferees when the conference collapsed last year.

The Science Committee included this language in the bill, H.R. 238, it reported this year. The Energy and Commerce Committee, Mr. Chairman, your committee had several similar provisions in its bill, too. So I submit that this ultra-deep and onshore exploration and production R&D language is really a production provision masquerading as an R&D provision. Development of these technologies under this provision will produce more than one-third of the gas estimated to be needed between now and the year 2015 at costs considerably less than importing an equivalent amount of LNG.

The history of natural gas production has proven that big increases in production occur when technology is applied to break

down production barriers. Coal bed methane is a case in point. In 1990, coal bed methane production was negligible. With an investment of 140 million, production began to increase to the point that today it is about 7 percent of annual gas production. There are other examples.

So, in closing, Mr. Chairman, there is broad consensus in this body for this legislation. You, Mr. Markey, and the majority leader, Mr. DeLay, certainly have been helpful on keeping these provisions in the conference, but we need you and the rest of the conferees to stand strong and push hard on our colleagues in the Senate when the conference convenes.

I don't exclude anyone else, including my friend Mr. Markey to the right, who is a good strong member of this committee, and purports and sets forth a desire to solve the energy problem. He has his ways and his methods, of course; and I can't sit here and say that he is totally wrong. He is a good man to work with, and we need to all work together.

The pending energy bill may be our last best opportunity to make a major breakthrough on production technologies that will yield huge returns in additional gas supplies. We can't afford to let this opportunity pass us by. The cost in increased natural gas prices, if we fail to act, will be truly enormous.

And I thank you, Mr. Chairman. I yield back my time, if I may.

Chairman TAUZIN. The gentleman has no time to yield, but we appreciate his opening statement.

Mr. HALL. I could go on.

Chairman TAUZIN. We all know.

The gentlelady, Ms. DeGette, has arrived. And the Chair will seek whether or not the gentlelady wishes to give an opening statement.

Ms. DEGETTE. Just briefly, Mr. Chairman.

Chairman TAUZIN. The gentlelady is recognized.

Ms. DEGETTE. I will ask unanimous consent to put my full opening statement in the record. And we have a large panel.

So let me just say that, as a Westerner, I was quite interested in this so-called EPCA report Ms. Solis was talking about, which concluded that public land protections are not holding our Nation's gas supply hostage. And I was a little dismayed that none of the witnesses talked about that conclusion in their written testimony. I am hoping someone will talk about this today. As we make very important land-use decisions in the West, particularly regarding BLM land, we need to keep in mind that while we need to develop our natural gas supplies in the West, that does not necessarily mean 100 percent development in all lands. And, if we have a reasonable land-use policy, we can still have robust natural gas development.

With that, I will yield back.

[The prepared statement of Hon. Diana DeGette follows:]

PREPARED STATEMENT OF HON. DIANA DEGETTE, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF COLORADO

I want to thank our chairman, Mr. Tauzin, for holding this hearing on natural gas supply and demand. Gas rates directly affect my constituents, just as they affect the constituents of every Member here. Clearly, we all have an interest in decreasing volatility in natural gas prices.

I believe that the panels the Chair has assembled well represent the supply side of the equation. And I look forward to discussing with our panelists the challenges and solutions of increasing the supply of natural gas.

But with all due respect to the panelists who are here today, I am somewhat confounded by what is not included in their testimonies. Not one mentions the recent survey from the Bush Administration's Department of Interior and the United States Geological Service. The so-called EPCA report concluded that public lands' protections are not holding our nation's gas supply hostage. I hope that the study's omission from everyone's testimony isn't because the results of the survey are inconsistent with industry claims that public lands' protections are the bogeyman. I also hope that the rumors of provisions in the energy bill to commission another study, maybe one that would be more to the Administration's liking, are unfounded.

I voted against the comprehensive energy bill that our committee marked up earlier this year because I felt it wasn't well balanced. The emphasis was almost entirely on production with little to address the need to conserve. This hearing is invoking similar flutters of déjà vu.

I am pleased that we will be hearing from Mr. Mason, Commissioner for the Public Utilities Commission of Ohio, who may have similar concerns to the utility companies in my district. An article from yesterday's Denver Post, my hometown paper, quotes an official from Xcel Energy, which supplies most of the power for my constituents' homes. "It will be incumbent on us to make sure our customers know that higher prices are coming, and that we do all we can to encourage conservation and energy efficiency. Education, conservation and energy efficiency will be our best weapons against higher prices . . ." After reading the testimony from Mr. Mason, it doesn't sound as if Xcel Energy's situation and approach are unique.

That article also mentions the effect rising prices will have on low-income residents. It may not be the right time to discuss this, but I hope that the Republicans will join us in ensuring that Americans who are the most vulnerable will not have to make the choice between feeding themselves and heating their homes come next winter. I think we ought to plan ahead and increase the money available for LIHEAP.

Those concerns aside, I look forward to hearing from the panelists assembled here today.

Chairman TAUZIN. The gentlelady yields back.

The gentlelady has made a request that the written statement be made a part of the record. Without objection, that is so ordered. And the chairman will note, generally for all members who have written statements, to introduce those statements into the record without objection. That is so ordered.

Are there further members seeking recognition?

[Additional statements submitted for the record follow:]

PREPARED STATEMENT OF HON. PAUL E. GILLMOR, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF OHIO

I thank the Chairman for the opportunity to address the issue of natural gas supply and demand as a major element of our country's energy debate. I also look forward to learning from a well-balanced panel of witnesses, as well as the honorable Chairman Greenspan later this afternoon.

Furthermore, I would like to extend a special welcome to fellow Buckeye Donald Mason, currently serving the Public Utilities Commission of Ohio (PUCO). In particular, I look forward to hearing your testimony regarding the volatility of natural gas prices and their affects on Ohio residential customers.

Over the last several years, a number of my constituents, many of which are on a fixed income, have written to convey their concern and at times, have enclosed copies of exorbitant natural gas bills.

Just as important, I represent a number of growers dependent on natural gas as the primary component in the production of commercial fertilizers. Northwest Ohio farmers have consistently communicated the need to stabilize natural gas markets to not only increase farm income, but become less dependent on support programs.

At a time when natural gas consumption is nearly four times greater than it was 50 years ago, and production continues to be limited due to the unpredictability of natural gas markets, I again applaud the Chairman for bringing attention to this important matter today.

I yield back the remainder of my time.

PREPARED STATEMENT OF HON. ED WHITFIELD, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF KENTUCKY

Thank you Mr. Chairman. Although this hearing is focused on natural gas, I wanted to take the opportunity to remind the Committee about the fundamental role of coal-based generation in supplying our nation's electricity. Although natural gas will fuel the majority of new capacity additions in the near future, new technologies could allow coal-based power to add 40,000 MW in the near term. According to the National Coal Council, an advisory group for the Secretary of Energy, this would minimize economic impacts while new generation facilities are sited, constructed, and brought into service without increasing emissions at existing facilities and, in some cases, lowering emissions. Approximately 25% of existing facilities can be targeted for repowering with much cleaner and more efficient coal-based power generation. I hope to be able to expand upon this at next week's hearing. Thank you.

PREPARED STATEMENT OF HON. C.L. "BUTCH" OTTER, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF IDAHO

Thank you, Mr. Chairman, for holding this hearing today. As our economy begins to recover, it is more important than ever that the United States maintain an abundant and reliable energy supply. While the Energy Policy Act passed earlier this year will go a long way toward achieving this goal, hearings like the one we're conducting today will help us to see what additional effort must be taken, if any.

Over the past several years, government policies have seemed to encourage the use of natural gas for environmental reasons as well as for energy efficiency. But those policies have not been updated to reflect new exploration and production technologies, most of which minimize environmental disruption while maximizing resource recovery. A consequence of these out-of-date policies has been to constrain the supply of gas despite growing market demand.

It is my understanding that there are plentiful natural gas supplies throughout the United States and Canada. However, many of the existing wells that have provided so much natural gas at reasonable prices are becoming depleted. Production must migrate to new areas and we must have the federal policies in place to allow the development of new sources.

Mr. Chairman, I look forward hearing from our witnesses today, to gain a better understanding of the outlook for natural gas in the United States.

Chairman TAUZIN. Then the Chair again welcomes our panel and will begin to introduce them.

First, let us welcome Mr. Guy Caruso, the Administrator of the Energy Information Agency of our own U.S. Department of Energy. Welcome, Mr. Caruso.

Mr. Richard Sharples, who is the Senior Vice President of Anadarko Petroleum Corporation on behalf of the Domestic Petroleum Council of the Oil & Gas Association. I think you are third, Mr. Sharples. There you are. We want to welcome you.

Mr. Donald Mason, the Commissioner of the Public Utilities Commission of the great State of Ohio, from Columbus, Ohio. And Mr. Mason, we want to recognize and welcome you, sir.

We have Mr. Carl English, President and Chief Executive Officer of Consumers Energy on behalf of the American Gas Association. Welcome, Mr. English.

Mr. Robert Liuzzi, President and CEO of CF Industries, Inc., on behalf of The Fertilizer Institute. Welcome, Mr. Liuzzi. I understand you have a plant in my district as well, so, welcome.

Mr. Forrest Hoglund, Chairman and CEO of the Arctic Resources Company in Houston, Texas. So, welcome, Mr. Hoglund.

Harold Kvisle, President and CEO of TransCanada Pipelines Limited of Calgary, Alberta, Canada. We want to welcome our neighbor from across the Big Divide.

And Mr. Jeffrey Currie, who is the Managing Director of Goldman, Sachs & Company of New York, New York. And, Mr. Currie, we also want to welcome you.

A distinguished panel indeed.

Our rules provide that we recognize you each for 5 minutes to summarize your written statements which are made a part of our record already. And we all have your written statements in front of us, so we would ask you not to read those statements, but to use the 5 minutes to summarize the key points of your statement, at which time we will then open the panel to discussion with our members, who will be recognized in order of appearance at the close of the opening statements.

So we will begin with Mr. Guy Caruso of our own Energy Information Administration, the Administrator of that important agency within the Department of Energy.

Mr. Caruso, welcome, sir. And we will take your testimony at this time.

STATEMENTS OF GUY F. CARUSO, ADMINISTRATOR, ENERGY INFORMATION ADMINISTRATION, U.S. DEPARTMENT OF ENERGY; DONALD L. MASON, COMMISSIONER, OHIO PUBLIC UTILITIES COMMISSION; RICHARD J. SHARPLES, SENIOR VICE PRESIDENT, ANADARKO PETROLEUM CORPORATION, ON BEHALF OF DOMESTIC PETROLEUM COUNCIL, U.S. OIL & GAS INSTITUTE, NATIONAL OCEAN INDUSTRIES ASSOCIATION, INDEPENDENT PETROLEUM ASSOCIATION OF AMERICA; CARL L. ENGLISH, PRESIDENT AND CEO, CONSUMERS ENERGY, ON BEHALF OF AMERICAN GAS ASSOCIATION; ROBERT C. LIUZZI, PRESIDENT AND CEO, CF INDUSTRIES, INC., ON BEHALF OF THE FERTILIZER INSTITUTE; FORREST E. HOGLUND, CHAIRMAN AND CEO, ARCTIC RESOURCES COMPANY; HAROLD N. KVISLE, PRESIDENT AND CEO, TransCANADA PIPELINES LIMITED; AND JEFFREY R. CURRIE, MANAGING DIRECTOR, GOLDMAN, SACHS & CO.

Mr. CARUSO. Thank you, Mr. Chairman. I appreciate this opportunity to present the Energy Information Administration's views on the natural gas market which are contained in the Short-Term Energy Outlook, which was recently released on June 6 and in our Annual Energy Outlook, which was released in January of this year.

As you know, the EIA does not take positions on policy issues, and indeed, we are charged with providing objective, timely, and relevant data, analysis and projections to the Department as well as to other Federal agencies, Congress, and the public so that officials may draw on our information and analysis to study energy policies.

Our outlooks, both short- and long-term, presented today represents our best assessment of what the current conditions are, including macroeconomic assumptions and our assumptions about things like the weather, which is critical to natural gas. And indeed, although our long-term energy Outlook takes policy in existence at the time of its publication as given we recognize the importance of policy changes that can very much affect these numbers,

such as the President's national energy plan and the legislation you are currently debating in both Houses.

So we recognize that although these numbers seem pointed and stark, they are not fixed in concrete, and things can change. And I know that is the purpose of this hearing, to see what can be done.

So, with that in mind, we note that the current natural gas market is tight, and the potential for significant volatility is high. As shown in the first chart, natural gas prices are now above $6 per million BTUs. And we expect the price of between $5 and $6 per million BTUs for the remainder of this year. Last winter's unseasonably cold weather drove natural gas prices higher. It depleted storage, which is holding up that price today, and we expect that to continue during the spring and the summer because there will be tremendous demand to refill the storage that we depleted.

The second chart shows the kind of storage refill that we face over the coming months. And we are about 29 percent below the 5-year average for working gas in storage as of the end of May as released in our latest report. So we have a steep hill to climb.

We are 2 months into the rebuild season, and we are well below average storage levels for this time of year.

Storage is expected to build to between 2.8 and 2.9 trillion cubic feet by the end of October, based on our latest Short-Term Energy Outlook. Under normal weather conditions, this should be enough to satisfy winter demand and to allow storage to be near normal if we have a typical winter. However, because demand to refill working gas in storage will be larger than average, EIA projects that natural gas prices will average between $5 and $6 per million BTU for the remainder of this year, and the potential for volatility is considerable.

On the supply side, natural gas production appears to have fallen in 2002, although data remains preliminary. Part of this loss is attributable to the hurricanes that occurred in the Gulf of Mexico in September and October.

This year, with the higher price of gas and the increased drilling rates, we do expect an increase in domestic production, but this is by no means certain because of the need to drill many more wells to produce enough gas to meet this resurgence in demand that has already been mentioned in opening statements. However, this extra effort might result in enough production to allow an increase of about 2 percent if our assumptions on productivity are accurate.

The point made about the depletion of the existing gas wells, by the chairman in his opening remarks, is shown, I think clearly, in the third chart. More than 50 percent of the gas that we expect to be produced in the United States this year is likely to come from wells drilled less than 3 years ago. This chart shows how high the current depletion rate is and points to the kind of drilling effort we need to meet demand. Imports are also expected to increase, but it will be not enough to meet the kind of refill we need.

Chairman TAUZIN. Mr. Caruso, your time has expired, sir. Can you wrap for us?

Mr. CARUSO. Sure.

Let me just finish by saying that we do expect prices to increase, as I mentioned, staying at the $5 to $6 per million BTUs range. However, over the longer term, the increase in drilling will, we do

believe, bring forth enough natural gas to moderate that price, so that although the short term is volatile, we do have hope in our long term that the increased production will bring that price back down into the $3 to $4 range.

[The prepared statement of Guy F. Caruso follows:]

PREPARED STATEMENT OF GUY F. CARUSO, ADMINISTRATOR, ENERGY INFORMATION ADMINISTRATION, DEPARTMENT OF ENERGY

Mr. Chairman and Members of the Committee: I appreciate the opportunity to appear before you today to discuss EIA's outlook for the U.S. natural gas market. The source of our short term projections is the June 2003 release of EIA's monthly Short-Term Energy Outlook; the long term projections are drawn from the National Energy Modeling System (NEMS).

The EIA is the statutorily chartered 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 Department of Energy, other Government agencies, the U.S. Congress, and the public. We do not take positions on policy issues. We produce data and analysis reports that are meant to help policy makers determine energy policy. Because we have an element of statutory independence with respect to the analyses that we publish, our views are strictly those of EIA. They should not be construed as representing those of the Department of Energy or the Administration.

SUMMARY

Short-Term Natural Gas Market (Through 2004)

Currently, the natural gas market in the United States is tight, with gas storage levels lagging well behind normal levels. Spot natural gas prices reflect this deficit and the expectation that demand, while not necessarily expected to exceed levels seen in 2002 on an annual basis, remains at a high level relative to domestic natural gas supply capability. The high market prices and strong drilling efforts are expected to ultimately allow gas storage volumes to move closer to normal by the beginning of the next heating season. This expectation, however, is predicated on prices continuing at high levels ($5.50-$6.00 per million Btu) through the next winter.

Longer-Term Natural Gas Market (Through 2025)

By 2025 total natural gas consumption is expected to increase to almost 35 trillion cubic feet (Tcf) or 26 percent of U.S. delivered energy consumption. Such a demand level represents an increase of about 52 percent from the expected 2003 level. Domestic gas production is expected to increase more slowly than consumption over the forecast, rising from 19.5 Tcf in 2001 to 26.4 Tcf in 2025. Growing production reflects increasing natural gas demand and is supported by rising wellhead gas prices, relatively abundant gas resources, and improvements in technologies, particularly for unconventional gas.

Short-Term Gas Market Analysis

Overview of U.S. Natural Gas Markets

The natural gas market is tight. The natural gas spot price at the Henry Hub (the market location used for pricing the New York Mercantile Exchange gas futures contracts) is high in historical terms for this time of the year. Spot natural gas prices have fluctuated around $6 per million btu (mmbtu) over the last several weeks, and levels of natural gas in underground storage remain low two months into the injection season. At the end of May, working gas in storage stood about 38 percent below end-of-May 2002 levels and 28 percent below the previous 5-year average. Spot natural gas prices will likely average $5-$6 per mmbtu through the rest of this year. The exceptionally low level of natural gas storage continues to place unusually strong upward pressure on near-term natural gas prices. In the current environment companies will need to obtain large amounts of natural gas from other sources to refill storage for the next heating season. Moreover, if abnormally warm weather prevails this summer the current market may become highly sensitive to demand, particularly in the Western and South Central United States, where natural gas is heavily used for power generation. Such conditions could cause a mid-year run-up in prices well above current levels (about $6 per mmbtu). However such price run-ups are usually short lived.

The projections outlined above are made at the national level, but it is important to emphasize that regional prices can diverge. Regional prices can also be highly volatile. For example, the average April spot price for natural gas traded at New York City was $5.94, down considerably from the $8.81 seen in March, a result of the usual change in seasonal demand levels but also of the high margins between the New York city gate and the Henry Hub that sometimes arise during peak demand periods.

Natural Gas Supply and Demand

With high natural gas prices, natural gas demand is expected to remain flat in 2003. Flat demand this year is likely despite sharply higher weather-related demand during the first quarter of 2003. Natural gas demand in 2004 is expected to remain flat as high prices discourage use enough to offset increases that might otherwise have accompanied industrial growth. Gas-intensive industrial growth (i.e., a composite index of industrial output, weighted by industry use of natural gas) is likely to be well below 1 percent this year, if indeed it is positive.

Demand for natural gas this summer is expected to fall by about 1 percent from last summer's level. This is in part due to weaker industrial demand. Under our assumption of normal weather, cooling degree-days for the season (Q2 2003 and Q3 2003) would be close to 10 percent below year-ago levels, reducing gas usage for power generation. In the event of a hotter-than-normal summer this year, natural gas prices could move higher as cooling-related demand would compete with the need to build storage inventories. The National Climate Prediction Center currently indicates that above-average temperatures in the U.S. Southwest and parts of Texas are likely in June and possibly in the third quarter as well. Such a development could increase gas demand for power generation and increase pressure on spot prices.

Working natural gas in storage is estimated to have reached about 1,212 billion cubic feet (bcf) at the end of May, 38 percent below the year-ago level. This is the second lowest aggregate inventory level for the end of May recorded by EIA. Eastern and producing regions stocks, in particular, are at very low levels. Demand for natural gas to refill working gas storage in 2003 will be higher than average, which means that prices are likely to remain volatile. Storage is expected to build to about 2,900 billion cubic feet by the end of October. Under normal weather conditions, this should be enough to allow storage to be about 1 trillion cubic feet at the end of next winter, near to normal for that stage of the storage cycle.

Natural gas production declined in 2002. Part of the loss was due to the effects of hurricane activity in the Gulf of Mexico in September and October. The last significant disruption in gas supply prior to the fall of 2002 was September of 1998. (While hurricanes regularly threaten platforms in the Gulf of Mexico, actual production impacts that are considered significant are not really very frequent and, when they do occur they tend to be short-lived.) Production is expected to increase by 2.2 percent this year. High natural gas prices and sharply higher oil and natural gas field revenues are expected to drive a resurgence in natural gas-directed drilling activity this year following a downturn in 2002. Monthly oil and natural gas field revenues are expected to continue to average close to $400 million this year. Domestic production growth should continue in 2004 but, given recent experience, the extra effort might result in increases of less than 2 percent from 2003 levels. The prospects for significant reductions in natural gas wellhead prices over the forecast period from the current high levels hinges in large measure on the productivity of the expected upsurge in drilling in terms of expected output.

Net Imports

Prospects for sharp increases in net imports in 2003 are limited but we do expect to see an overall increase in 2003 of about 2 percent. Substantial increases in LNG imports are possible and we believe that they have made a noticeable contribution already this year. Canadian exports to the United States were up 3-4 percent from year ago in early 2003. Any growth in gross imports is likely to be offset partially by increased exports to Mexico, which have been rising sharply in recent years.

Prospects for Price Volatility

In light of the current low storage levels, chances of continued price volatility are great. Let me raise some factors that could contribute to volatility and analyze their likely impacts, as summarized in the Table below. To examine these effects, we ran the model under alternative assumptions.

Volatility Factors

Factor	Assumption	Price Impact
Weather	10% Hotter Summer/Colder Winter Relative to Normal.	50%-60% higher peak price this winter
Lower than expected domestic supply.	Productive capacity continues to weaken, no production growth in 2003.	10%-20% higher peak price this winter

The table shows that a significant tightening of the U.S. natural gas market and much higher prices than expected in our base case are possible under some plausible scenarios. One development that could generate more difficult market conditions than are already in prospect is the weather. An abnormally hot summer followed by a cold winter could push natural gas deliverability to the limit and cause record average prices this winter. The severe weather case considered here is an extreme case but one that merits attention given the lack of storage cushion. It is also apparent that less robust assumptions about natural gas productive capacity and near-term production could shift average prices well above our base case. It appears that for every 1 percent that production falls below our base case assumptions, we can expect 5-10 percent higher peak prices this winter. These estimated average impacts mask the potential for much more dramatic spikes in prices for short periods (a few days to a few weeks). Such spikes are characteristic of net demand surges in the context of low natural gas storage. Thus, current and prospective conditions in the U.S. gas market significantly increase the probability of very sharp short-term spikes on top of generally high levels of natural gas prices.

There are no detailed estimates concerning the extent to which industrial output weakness seen since 2000 is attributable to the recent episodes of natural gas price strength. It is obvious, however, that many industries dependent upon natural gas for basic processes and operations have been hurt by high natural gas prices. Part of the short-term market response to the current imbalance in supplies may be to let high prices back out industrial activity to insure that higher-valued demands, such as heating, are met. While the price volatility described in this section is clearly possible, it is not a foregone conclusion. Normal weather, improved productivity from newer natural gas wells and other factors could serve to moderate price increases. It is also important to note that recent history illustrates that price volatility is usually short-lived.

Longer-Term Natural Gas Market Analysis

The longer-term natural gas projections provided in this testimony were produced using the National Energy Modeling System (NEMS), a computer-based, energy-economy modeling system of U.S. energy markets through 2025. NEMS projects annual production, imports, consumption, and prices of energy, subject to assumptions on macroeconomic and financial factors, world energy markets, resource availability and costs, behavioral and technological choice criteria, cost and performance characteristics of energy technologies, and demographics. Two of the key inputs to NEMS are re world oil prices and macroeconomic growth.

World oil prices averaged about $23.43 per barrel in 2002 in 2001 dollars. Between now and 2025 they are expected to rise to about $26.60 a barrel in 2001 dollars, as world oil demand increases from 78 million barrels per day to 119 million barrels per day.[1] Real gross domestic product (GDP) is projected to grow at an annual average rate of 3.0 percent between 2001 and 2025.

The natural gas projections discussed in this testimony are based on the most current NEMS configuration, which EIA recently used in analyzing a 10 percent renewable portfolio standard, as requested by Senator Bingaman.

Natural Gas Outlook to 2025

y 2025 total natural gas consumption is expected to increase to almost 35 trillion cubic feet (Tcf) or 26 percent of U.S. delivered energy consumption.

Domestic gas production is expected to increase more slowly than consumption over the forecast, rising from 19.5 Tcf in 2001 to 26.4 Tcf in 2025. Growing production reflects increasing natural gas demand and is supported by rising wellhead gas prices, relatively abundant gas resources, and improvements in technologies, particularly for unconventional gas. In this forecast, economic conditions allow an Alaskan pipeline to begin moving gas to the lower 48 States in 2020. The national average wellhead price is projected to reach $3.95 per Mcf in 2001 dollars by 2025.

[1] Energy Information Adeministration, *International Energy Outlook 2003,* Table A4, page 185.

The difference between consumption and production is made up by increasing use of imports throughout the forecast, particularly from liquefied natural gas (LNG), with a 2.1 Tcf increase expected over 2001 levels. By 2025 we expect expansion at the four existing terminals and construction of three new LNG terminals.

Consumption. U.S. natural gas consumption is expected to increase by 1.8 percent annually from 2001 through 2025. Gas consumption by electric generators is expected to double over the forecast, from 5.3 Tcf in 2001 to 10.4 Tcf in 2025, an average annual growth rate of 2.8 percent. Demand by electricity generators is expected to account for 30 percent of total natural gas consumption in 2025.

Most new electricity generation capacity is expected to be fueled by natural gas, so natural gas consumption in the electricity generation sector is projected to grow rapidly throughout the forecast as electricity consumption increases. Although average coal prices to electricity generators are projected to fall throughout the forecast, gas-fired generators are expected to have advantages over coal-fired generators, including lower capital costs, higher fuel efficiencies, shorter construction lead times, and lower emissions.

Historically the industrial sector, excluding lease and plant fuel, is the largest gas-consuming sector, with significant amounts of gas used in the bulk chemical and refining sectors. Industrial consumption is expected to increase by 3.4 Tcf over the forecast, driven primarily by macroeconomic growth. The chemical and metal durables sectors show the largest growth.

Combined consumption in the residential and commercial sectors is projected to increase by 2.5 Tcf from 2001 to 2025, driven by increasing population, healthy economic growth, and gradually rising prices in real terms. Natural gas remains the overwhelming choice for home heating throughout the forecast period, with the number of natural gas furnaces rising nearly 18 million.

Production. The forecast estimate of total technically recoverable natural gas resources as of January 1, 2002, is 1,289 Tcf. These resource assessments come primarily from the assessments done by the U.S. Geological Survey for onshore regions and by the Mineral Management Service for the offshore.

These resources included 183 Tcf of proved reserves (9 years of consumption at 20 Tcf per year), 222 Tcf of inferred reserves, and 269 Tcf of undiscovered nonassociated conventional resources. The largest category was unconventional resources at 445 Tcf, with most of that in tight sandstones at 71 percent. Other unconventional natural gas resources include gas shales and coalbed methane. Alaska gas (32 Tcf) and associated-dissolved natural gas in lower 48 crude oil reservoirs (137 Tcf) round out the resource.

Increased U.S. natural gas production through 2025 comes primarily from unconventional sources and from Alaska. Unconventional gas production increases by 4.2 Tcf over the forecast period—more than any other source, largely because of expanded tight sands gas production in the Rocky Mountain region. Annual production from unconventional sources is expected to account for 36 percent of production in 2025, more than any other source, compared to 28 percent today.

Conventional onshore non-associated production increases by 500 Bcf over the forecast, driven by technological improvements and rising natural gas prices. However, its share of total production declines from 34 percent in 2001 to 27 percent by 2025. Non-associated offshore production adds 710 Bcf, with increased drilling activity in deep waters; however, its share of total U.S. production declines from 22 percent in 2001 to 19 percent by 2025.

Depletion. A key question facing producers and policymakers today is whether natural gas resources in the mature onshore lower 48 States have been exploited to a point at which more rapid depletion rates eliminate the possibility of increasing—or even maintaining—current production levels at reasonable cost.

Depletion is a natural phenomenon that accompanies the development of all nonrenewable resources. Physically, depletion is the progressive reduction of the overall volume of a resource over time as the resource is produced. In the petroleum industry, depletion may also more narrowly refer to the decline of production associated with a particular well, reservoir, or field. As existing wells, reservoirs, and fields are depleted, new resources must be developed to replace depleted reservoirs.

Depletion has been counterbalanced historically by improvements in technology that have allowed gas resources to be discovered more efficiently, have extended the economic life of existing fields, and have allowed natural gas to be produced less expensively, making available resources that previously were too costly to develop. In these natural gas projections, technological progress for both conventional and unconventional recovery is expected to continue to enhance exploration, reduce costs, and improve production technology.

The depletion of conventional and unconventional natural gas resources is expected to continue over the projection period as the demand for natural gas in-

creases significantly, continuing the trend that began in the mid-1990s. Nevertheless, with sustained wellhead prices generally over $3 per thousand cubic feet (in 2001 dollars) and continued technological improvements, lower 48 nonassociated gas production is expected to increase above current levels.

Imports. Net imports of natural gas, primarily from Canada, are projected to increase from 3.7 trillion cubic feet in 2001 to 7.9 trillion cubic feet in 2025. Imports contributed 16 percent to total natural gas supply in 2001, compared to an expected 23 percent in 2025.

Just over half of the increase in U.S. imports is expected to come from LNG. Much of the increase comes from expansion at existing sites, but three additional facilities are also projected. By 2025, LNG imports are expected to equal 7 percent of total U.S. gas supply.

Growth in pipeline imports from Canada partly depends on the completion of the MacKenzie Delta pipeline. The initial full flow rate into Alberta is assumed to be 1.5 Bcf per day. Additional Canadian imports will come from the Scotian Shelf in the offshore Atlantic. The forecast of Canadian imports largely depends on the ability of Canadian producers to economically produce and market their untapped unconventional resources, particularly coalbed methane. Net imports from Canada are projected to provide 15 percent of total U.S. supply in 2025 in the reference case, about the same as in 2001.

Wellhead Prices. In the mid-term, gas prices are projected to move higher as technology improvements and new supply sources prove unable to completely offset the effects of resource depletion and increased demand.

Natural gas prices through 2025 are projected to increase in an uneven fashion as major new, large-volume supply projects temporarily depress prices when initially brought online. Examples include deep and ultra-deep offshore projects in the Gulf of Mexico, unconventional gas (tight sands, coalbed methane, shale), liquefied natural gas facilities (both the expansion of existing and development of new facilities), the MacKenzie Delta pipeline in Canada, and an Alaskan natural gas pipeline that delivers gas supplies to the lower 48 States.

In the reference case, average wellhead natural gas prices are expected to be $3.95 per thousand cubic feet (2001 dollars) in 2025. The increase reflects rising demand for natural gas and the impact of the progression of discoveries from larger and more profitable fields to smaller, less economical ones. In current dollars, natural gas prices reach $7.15 in 2025.

End-Use Prices. End-use natural gas prices are expected to increase gradually starting in about 2005 as a result of increasing wellhead prices. A portion of the increase in wellhead prices is expected to be offset by a projected decline in average transmission and distribution margins as a larger proportion of the natural gas delivery infrastructure becomes fully depreciated. The average end-use price is expected to increase by 40 cents per thousand cubic feet between 2005 and 2025 (in constant 2001 dollars), compared with an increase of 72 cents per thousand cubic feet in the average price of domestic and imported natural gas supplies over the same period. Part of this difference is attributable to an increasing share of natural gas sold to electric generators, the sector with the lowest prices.

Chairman TAUZIN. Thank you, Mr. Caruso.

The Chair is now pleased to recognize Mr. Mason, the Commissioner of Public Utilities Commission of the great State of Ohio. Mr. Mason.

STATEMENT OF DONALD L. MASON

Mr. MASON. Thank you, Mr. Chairman, members of the committee. I would like to talk more from the residential consumer's side of the equation. And I appreciate all the information provided by the DOE, EIA. And I want to comment that the remarks by Congressmen were all to the point, very succinct and very factual.

Now, as I had information from the residential consumer standpoint in Ohio, the average homeowner in the southern part of the State uses maybe 100 MCF of natural gas and in the northern portion of the State maybe 110 MCF of gas every year.

Now, what is interesting is, due to high prices 2 years ago, consumers have already dramatically cut back their home heating in terms of setting back the temperatures, modernizing appliances,

equipment, things of that nature, so that an issue becomes, how much more can residential consumers do to curb demand for natural gas?

Based on my discussions with Ohio utilities, I would say, on a minimum, today's gas being stored is between $2.50 and $3 more an MCF than it was last year. In real terms, this means the average residential homeowner this winter is going to pay about $220 more than the previous winter.

Now, what does $220 mean? I guess, if you think about it, it means that some people will be able to pay the bill, but it also means that some people will not. In the past, we have seen an increase of uncollectibles from one company doing business in Ohio—by uncollectibles, I mean people who couldn't pay their bills—jump from $10 million a year to about $26 million a year. Basically, that also means disconnection from services increased by about 50 percent for those residential customers.

And what does it mean when a home is disconnected from a gas source? Well, even in the summertime, it might mean a lack of hot water. Additionally, as we all know, if it is still in the colder times of the year—and, quite frankly, in Ohio it is quite common to run your chimneys or furnaces even through early June—it means a loss of heat. It also means to some degree destruction of consumer credit and family stability. These are things that we worry about.

Now, going back to what we were discussing earlier, yes, gas is being filled at about $3 an MCF higher than it was ago. But our grave concern is for the coming winter heating season with the volatility of the spot market. As indicated earlier, last year we had about 3.2 TCF of natural gas stored by the time we began the winter heating season, but unfortunately we drew that down very low. And so, as a regulator who works to maintain the fact that local gas companies are storing gas, I guess my big concern is the fact that our storage levels are still 40 to 50 percent lower than what we would like to see them at.

I guess my message for residential consumers—and then perhaps each of you could take it back to your respective districts—is, we need to increase and pay attention to the demand side by encouraging local gas companies and regulatory authorities to promote budget billing and payments for residential customers to even out the load of the residential bill, so it doesn't hit them all at once. Also, we would like to encourage utilities to use financial and physical hedges to reduce the volatility of prices to those residential customers, especially gas bought in spot markets. Obviously, increasing public awareness of the benefits of home weatherization, and asking residential customers to once again encourage examining their own appliances and the settings of their temperatures.

But finally, obviously if there is attention to the demand side, there must also be attention to the supply side. It has been discussed earlier, when appropriate—looking at opening up public lands and offshore to drilling activity when appropriate; but also, as mentioned earlier, encouraging technologies that promote a multitude of energy options for electricity generation so that residential heating customers are not competing against electricity utilities for gas consumption.

Finally, something we can all do is work on streamlining gas pipeline permitting and construction in the Midwest and Northeast so that those markets have more gas options available to them; and finally, improving the tax and fiscal policies of our country to encourage investment of capital in energy exploration and pipeline transportation.

Once again, I thank you for the opportunity to represent residential customers.

[The prepared statement of Donald L. Mason follows:]

PREPARED STATEMENT OF DONALD L. MASON, COMMISSIONER, PUBLIC UTILITIES COMMISSION OF OHIO

Mr. Chairman, members of the committee, my name is Don Mason and I am a Commissioner of the Public Utilities Commission of Ohio. I would like to thank you for the opportunity to discuss the impact of potential natural gas supply shortages on consumers. In Ohio, the average residential natural gas consumption ranges from 100 mcf annually in the southern part of the state to about 110 mcf in northern Ohio. It is important to note that this is 5% lower than historic demand. Residential consumers have already responded to high natural gas prices by decreasing consumption over the last several years. Residential consumers have modernized appliances and set back their thermostats. Therefore, my message to homeowners and renters is the conservation of energy can only have a marginal impact on their natural gas bills.

Based on discussions with Ohio companies, I am anticipating that we will see a minimum of $2.50-$3.00 per mcf increase to residential natural gas customers, this winter heating season. In real terms, the home heating cost this winter will increase by at least $220 per household. That might not sound significant, but during the winter season of 2000-2001, one gas company in Ohio saw residential nonpayment jump from $10 million a year to $26 million. As a result, 2002 saw an increase of 50% of residential customers who were disconnected from gas service. It is hard to measure the suffering that takes place to a family that has high heating bills; only to have their hot water and heating disconnected, which could even occur during the summer months. Additionally, those families that do manage to make payments, substitute those payments for other important items, or delay paying other bills. Either outcome affects consumer credit and family stability.

The natural gas which is being stored this spring and summer will provide the base load, or about 50% of Ohio's residential consumers' winter needs. I have concerns for the upcoming winter heating season. Natural gas going into storage is about $3.00 higher per mcf than last year. However, comparatively speaking, that is the good news. There is no good way of predicting what the cost associated with the spot market will be if the winter is a long, cold one without relief. This past year, the nation was fortunate to have about 3.2 tcf of gas in storage, compared to current storage level of 1.2 tcf. Typically, at this time we should have at least 1.7 tcf of gas in storage, and as you can see we are considerably behind. If the summer is hot, and natural gas-fired electricity generation creates a competitive demand for gas, then the price of stored gas will be even higher than originally anticipated. It is possible that we can see spot market gas at $10.00 to $12.00 per mcf.

Government officials can have the greatest impact on this impending problem by first increasing public awareness that their gas prices are going to be higher this coming heating season. We can do this on our own as well as with the help of the local distribution companies, in the form of bill inserts for example. The best form of demand management or conservation is price signal.

Unfortunately, gas is used BEFORE the consumer sees a bill. People need to know the price is going up BEFORE they use the gas, this will help them prepare for the "sticker shock," thereby lessening the "shock." It will also help them make their own choices about how best to manage their energy needs.

After examining the natural gas supply and demand curves, and recognizing that the prediction for high gas prices is a likely scenario, I would like to leave you with the following recommendations.

Federal and state government leaders need to encourage energy conservation and increase the supply of natural gas.

We need to increase attention to the demand side by:

- Encouraging local natural gas companies and regulatory authorities to promote budget billing and payments for residential consumers;

- Utilize regulatory authorities to encourage local gas companies to utilize financial and physical hedges to reduce the impacts of high gas prices, especially spot market gas purchases;
- Increasing public awareness on the effectiveness of home weatherization; and,
- Encouraging residential consumers to examine the temperature settings and the age of their existing appliances.

We need to increase attention to the supply side by:

- Where appropriate, opening public lands and off shore locations to exploration activity;
- Encouraging technologies that promote a multitude of energy options for electricity generation so that residential heating consumption and gas storage do not compete against electricity generation;
- Streamlining gas pipeline siting and construction so that the Midwest and Northeast markets have more options available to transport natural gas and product; and,
- Improving the tax and fiscal policies of our country to encourage the investment of capital in energy exploration and pipeline transportation.

I would like to thank the Chairman and the Members of the Committee for allowing me to present my views today. I would be happy to address any questions you may have at the appropriate time.

Chairman TAUZIN. Thank you, Mr. Mason.

We have heard of the hope of our agency and the problems consumers are facing. Now we will hear from the industry. Mr. Sharples is representing the U.S. Oil & Gas Association, Domestic Petroleum Council.

Welcome, Mr. Sharples.

STATEMENT OF RICHARD J. SHARPLES

Mr. SHARPLES. Thank you, Mr. Chairman and members of the committee.

Anadarko is the seventh largest producer of natural gas in the U.S., and last week we had more rigs drilling for gas than any other company. I appreciate the opportunity to talk with you about the current state of the natural gas market, because gas is such a big part of Anadarko's future and of the members of each of the associations I am also testifying on behalf of today.

I think we all agree that we face a serious challenge with the growing gap between supply and potential demand for natural gas. I, too, am anxious to hear Chairman Greenspan's comments this afternoon, because I believe he was right on target last month when he called our policy toward gas exploration, "contradictory."

I would like to make three points today.

First, the situation did not develop overnight, and we can't solve it overnight. Second, if we maintain the status quo, we will continue to see high volatility and upward price pressure. And, third, I believe there are ways to address the challenge, but only if we have the political will to do so.

There are vast energy resources beneath Federal lands, but congressional action and administration practices have locked up that energy. Congress needs to find a way to unlock it.

While the U.S. rig count is up this year, don't expect gas production to increase significantly, because traditional producing areas are playing out. New supplies are barely offsetting the effect of natural declines.

We do have one slide, if we could put it up. This slide shows trends in the shallow water Gulf of Mexico, and illustrates how difficult it is to increase production from the mature producing areas.

Industry has drilled here since 1938. The first 1,000 discoveries made on the shelf added about 40 billion barrels of oil equivalent, most of which was natural gas. But the next 1,000 discoveries are expected to generate just 6 billion because the basin is mature. We have drilled it and drilled it and drilled it.

Even with increased drilling, production is falling, new wells are coming on at lower rates, and their decline rates are steeper. Most of the gas we will find onshore in the future will be unconventional, gas that is higher-cost and lower-margin. Offshore we will be drilling deeper wells in deeper water. Unless we are allowed to explore in less mature basins, price volatility and upper price pressure are a certainty.

The economic effect on Americans will be twofold. First is on the pocketbook, whether it is residents paying more to heat or cool their homes, or businesses paying more to fuel their factories. It could also cost a lot of Americans their jobs. If we can't find cheaper gas sources, manufacturers that are heavy users of gas will continue to move plants to countries where it is cheaper.

Make no mistake, the U.S. isn't running out of natural gas, but we are running out of places where we are allowed to explore for gas that can be developed cost effectively. The traditional producing States of Texas, Alabama, Louisiana, Mississippi, Oklahoma, and Kansas have all lost gas production since 1995. What growth we have seen has been primarily in the Western States.

To increase supply, we have to attack the problem on several fronts. First, Congress needs to come up with a solution that will lift the moratorium on certain Federal acreage where the resource is the greatest. Except for House language that would open a small portion of the coastal plain of ANWR for exploration, there is nothing in either House or Senate bill that would remove the moratorium. We are not asking that Congress open up every acre of Federal land, but there are areas where we can explore today and develop without harming the environment. We have proved that is possible by using advanced technology that is getting better every day.

Second, Federal land management agencies need to detangle the bureaucracy and eliminate unnecessary leasing and permitting delays that are discouraging exploration. In high-cost areas, delay is denial, whether it is due to regulatory inefficiency or to lawsuits that can stall projects for months or even years. This is an area that was not addressed in EPCA study that was referenced in the opening remarks.

We need more staff at the BLM to review backlogged applications and a consistent playbook to tell us up front what we must do to get our projects permitted. The administration also needs to remove regulatory barriers to pipeline permitting so we can unlock stranded gas from the West and, 1 day, bring arctic gas to the Lower 48. And, in the future, we will have to rely on LNG to help close the supply gap.

So the third thing we need to do is to be able to permit and build regasification terminals quickly.

A number of exploration incentives were passed in the House bill and are being considered by the Senate. Some of them would enhance existing royalty reductions for deep-water and deep-gas

projects offshore, accelerate amortization of geological and geophysical costs in delay rentals, provide 7-year depreciation for gathering lines, and renew Section 29 credits for unconventional gas.

Since most of the remaining resource is unconventional or in deep water, these incentives are important to developing more U.S. gas, and we support them.

Ladies and gentlemen, we do face a serious challenge. Industry is working hard to produce new supplies, but vast resources that could make a difference are controlled by the Federal Government, and only the government can unlock them. We must begin making changes today in land-use policy and in how we balance environmental concerns with economic considerations if we want natural gas to be available to Americans at prices they can afford.

Thank you for the opportunity to address you today, and our industry looks forward to working with you to provide Americans with affordable, reliable energy supplies.

[The prepared statement of Richard J. Sharples follows:]

PREPARED STATEMENT OF RICHARD J. SHARPLES, SENIOR VICE PRESIDENT, MARKETING & MINERALS, ANADARKO PETROLEUM CORPORATION, ALSO REPRESENTING THE AMERICAN PETROLEUM INSTITUTE, THE DOMESTIC PETROLEUM COUNCIL, THE INDEPENDENT PETROLEUM ASSOCIATION OF AMERICA, THE NATIONAL OCEAN INDUSTRIES ASSOCIATION, THE NATURAL GAS SUPPLY ASSOCIATION, AND THE US OIL AND GAS ASSOCIATION

Thank you, Mr. Chairman, and members of the committee. I'm Dick Sharples, senior vice president of marketing and minerals for Houston-based Anadarko Petroleum.

Anadarko is the seventh-largest producer of natural gas in the U.S., and last week we had more rigs drilling for gas in the U.S. than any other company. So, I appreciate the opportunity to talk with you about the current state of the natural gas market today, because gas is such a big part of Anadarko's future—and of the members of each of the associations I am also testifying on behalf of today.

I think we all agree that we face a real challenge with the growing gap between natural gas supply and demand. I'm anxious to hear Chairman Greenspan's comments this afternoon, because he was right on target last month when he called our policy toward gas exploration, quote "*contradictory*."

Three points I'd like to make today:

First—the gas supply/demand gap didn't develop overnight, and we can't solve it overnight. This is a long-term, structural issue that requires major changes in our current energy policy.

Second—if we maintain the status quo, we *will* continue to have high levels of volatility and upward pressure on price.

And third—there *are* ways to solve this problem—but only if we have the political will to do so. There are vast energy resources beneath federal lands, but congressional actions and administrative practices have effectively *locked up* this energy. Congress needs to find a way to unlock it.

While it's true that the U.S. rig count is up about 25 percent over a year ago, don't expect gas production to increase. The reason is simple: traditional producing areas are playing out. New supplies we bring on will barely offset natural declines.

Three slides I'd like to show you illustrate my point. I've used the Gulf of Mexico as an example, because it provides about one-quarter of U.S. gas production, and the trends are pretty startling.

(Slide 1: Exploration Challenge: Basin Maturity)

This curve shows how difficult it is to increase reserves today: The first 1,000 discoveries on the Shelf in the Gulf of Mexico added 40 billion barrels of oil equivalent of reserves, but the next thousand will generate a maximum of 6 billion, because the basin is mature.

(Slide 2: Exploration Challenge: Basin Maturity)

Here, you can see that while we've been drilling more wells every year—with the exception of last year when prices were in a slump—average daily production has been falling.

(Slide 3: Exploration Challenge: Well Productivity)

This graph shows that over the last few years, new wells are coming online at lower production rates, and their decline is much steeper.

Western Canada—which provides 18 percent of U.S. gas demand—is also declining. Canadian gas imports declined almost 3 percent in 2002, and they're expected to drop another 5 percent this year.

Going forward, most of the gas that we'll find in this country onshore will be "unconventional"—tight sands gas, shale, and coal bed methane—gas that is higher cost and lower margin. Offshore, we'll be drilling deeper wells in deeper water.

Today, we are literally squeezing the last molecules of energy out of the basins where we have access. But as someone's wise old grandma used to say, "we can't get blood out of a turnip." That's what we face today in the domestic industry.

Unless we are allowed to explore in less mature basins, using technology that has allowed us to find and produce oil and gas more cost effectively and with less and less impact on the environment, price volatility and upward price pressure are a certainty, as the market struggles to balance.

Another important point: The market *is working,* despite the tightening between supply and demand. More rigs are running . . . gas is getting to customers who need and value it the most . . . and gas is going into storage.

But in the future, the market will have to balance at higher prices than we've seen in the past unless we can tap lower-cost resources.

As in any industry, capital chases the highest returns. It makes no sense for producers to invest in low-margin projects in worn-out U.S. basins when higher-potential opportunities lay across the ocean.

The economic effect of these higher prices will be two-fold:

The first is on the pocketbook, whether it's residents paying more to heat or cool their homes, or businesses paying more to fuel their factories.

The average American paid 20 percent higher prices for natural gas during the first quarter of this year, compared with the same period in 2002. (*Source: Consumer Price Index Data*)

It could also cost a lot of Americans their jobs. If we can't find more cost competitive sources, manufacturers that use large amounts of gas for fuel or feedstocks will move plants to countries where it is cheaper.

Take ammonia, for example, which is a major feedstock for fertilizer. A U.S.G.S. study shows that from 1999 to 2002 alone, ammonia production decreased 26 percent, employment by this industry decreased 23 percent, and U.S. reliance on imports increased from 20 percent to 34 percent. (*Source: U.S.G.S. Geological Survey's Mineral Commodity Summaries*)

These job losses could become permanent. In fact, industrial production capacity is already beginning to relocate overseas. For example, 41 percent of the ammonia production capacity in Trinidad has been built just since 1996, representing about $700 million of investment. Last year 56 percent of U.S. ammonia imports were sourced from Trinidad while 43 percent of U.S. capacity lay idle.

So our inability to grow supply due to misguided energy policies is a *consumer* issue, not just an industry issue. In fact, elected representatives of the consuming states ought to be hollering loudest for policy change.

The U.S. *isn't* running out of gas. The U.S.G.S. and the Minerals Management Service estimate there are about 1,400 trillion cubic feet of technically recoverable gas resources in the U.S.—including the Lower 48, offshore and Alaska.

But we *are* running out of places where we're allowed to explore for those gas resources that can be developed most cost effectively. Yes, there is a lot of natural gas left in the basins we've been producing for the last 60 years, and U.S. producers are actively exploring for and producing it. But as I explained a moment ago, because of basin exhaustion, this is mostly high-cost gas. Some of the most cost-effective gas resources we have left are found on federal lands.

In the Lower 48 alone, there is an estimated 213 trillion cubic feet of natural gas beneath federal lands or waters where moratoria or regulation make exploration virtually impossible . . . in the West, where much of the land is owned by the federal government . . . on the East and West Coasts, and in the Eastern Gulf of Mexico. That's a 10-year supply at today's demand rate. And if history is a reliable guide, as more exploration takes place, these estimates could turn out to be very conservative.

In the West, there is more than 290 Tcf of technically recoverable gas located on federal lands, but nearly half is either closed to exploration or so highly restricted it's not economic to explore. (*Source: National Petroleum Council Natural Gas Study, December 1999*)

To increase supply, we have to attack the problem on several fronts:

First, Congress needs to come up with a solution that will lift the moratoria on certain federal acreage where the resource base is the greatest.

We're not asking that Congress open up every acre of federal land. But there are areas where we can explore and develop a lot of oil and gas without harming the environment. We've proved that's possible by using advanced technology that's getting better every day.

(Slide 4: Alpine—A new Approach)

A great example is the Alpine field Anadarko is a partner in on the North Slope of Alaska—a little over 100 miles west of the coastal plain of ANWR. We've developed this 430 million barrel field from gravel pads totaling less than 100 acres using multi-lateral well completions. Today, Alpine is producing over 100,000 barrels a day.

In Alaska, tools such as ice pads and roads, multilateral well completions and reinjection of drilling wastes allow us to minimize the impact on the tundra. We use a variety of different tools to tackle other complex exploration and development challenges all over the world—safely and responsibly.

Second, federal land management agencies need to detangle the administrative bureaucracy and eliminate unnecessary leasing and permitting delays that discourage exploration. In high-cost areas, *delay is denial,* whether it's due to regulatory inefficiency or to lawsuits that can stall projects for months or even years. If we could speed up permitting and reduce the threat of litigation, we'd see an immediate increase in exploration.

(Slide 5: Grass Roots Timeline)

As this slide illustrates, when you consider the fact that wildlife restrictions and other stipulations prevent us from operating more than half the year in some areas of the West, and you factor in all the steps it takes to permit a well, it can take six to seven years just to reach the development drilling stage. And that makes no sense.

The administration took a good first step by ordering fast-track updates of resource management plans in the West. But we need more staff at the BLM to review backlogged applications, and we need a consistent play book to tell us upfront what we must do to get our projects permitted.

The administration also needs to remove unnecessary regulatory barriers to pipeline permitting, so we can unlock stranded gas from the West . . . and one day bring Arctic gas to the Lower 48.

In the future, we will have to rely on LNG to help close the supply gap, so the *third thing* we need is to be able to permit and build regassification terminals—quickly.

Let me make an important point about LNG: We cannot import our way out of this supply crunch, either with Canadian gas or LNG, as we have done with imported oil. Even if we start permitting new import facilities today, it will take 5 to 10 years to meaningfully increase our supply of LNG. So this is a long-term solution, albeit an important one.

Next, let's look at exploration incentives: A number of incentives were included in legislation passed by the House, and they're being considered by the Senate. These would enhance existing royalty reductions for deep water and deep gas projects offshore . . . allow accelerated amortization of G&G costs and delay rental payments' provide seven-year depreciation for gas gathering lines . . . and renew Section 29 production tax credits for unconventional gas.

As I said a moment ago, most of the remaining resource is unconventional or in deep water, so these incentives will be important to helping producers develop more of our domestic resources.

We know these incentives work. Passage of Section 29, for example, led to a tripling in the production of non-conventional gas, and it resulted in innovation in drilling and completion technology. (*Source: Gas Technology Institute*)

We *do* have the ability to increase domestic supplies—and in doing so increase U.S. energy *security*—but only if we have the political will to do so.

Ladies and gentlemen, as a nation, we face a serious energy challenge. Industry is working as hard as it can to produce new supplies. New technology and good management practices allow us to do so in environmentally acceptable ways, with less and less temporary surface disturbance. But the vast energy resource potential that could address this challenge is under the control of the federal government, and only the *government* can unlock it.

We must begin to make changes *today*—changes in federal land use policy and in how we balance environmental concerns with economic considerations—if we want this safe, environmentally friendly fuel to be available to Americans at prices they can afford.

Thank you for the opportunity to address you today. Our industry looks forward to working with you to provide our country with the affordable, reliable energy supplies that are critical to a strong, growing economy.

Chairman TAUZIN. Thank you, Mr. Sharples.

Likewise, we want to welcome the President and Chief Executive Officer of Consumers Energy on behalf of the American Gas Association, Mr. Carl English.

Mr. English, you are recognized, sir.

STATEMENT OF CARL L. ENGLISH

Mr. ENGLISH. Thank you, Mr. Chairman. Good morning.

As you indicated I am the President and Chief Executive of Consumers Energy, a publicly owned gas utility based in Jackson, Michigan.

I am appearing today also on behalf of the American Gas Association and its 191 member companies. AGA's membership includes natural gas distribution companies and utilities serving more than 53 million of our Nation's homes, businesses and industries. We appreciate the opportunity to share the industry's views with you on the urgent need for ample natural gas supplies to be made available at competitive prices.

Natural gas is the most popular home heating source in America and for a good reason. More than 50 million households have chosen natural gas heat because it is comfortable, efficient and reliable. Natural gas is also the fuel of choice for America's economic prosperity and is gaining in popularity as a fuel source for electric generation, as you know.

The current natural gas crunch has exposed millions of families to a roller coaster ride of prices. Two of the last three winters have seen abnormal and often record cold temperatures. Demand spikes saw prices skyrocket, jumping as much as 70 percent in 1 year. Prices increased because the extremely tight balance between supply and demand hasn't eased. Even with the return to summer, the wholesale price of natural gas is twice as high as it was last year at this time.

In addition to heating the majority of American homes, natural gas also forms the energy backbone of the manufacturing sector. More than 50 percent of the natural gas consumed in the United States is used by factories and other industrial customers. In a world market, domestic manufacturers cannot remain competitive with natural gas prices that are two and three times higher than they were just a few years ago.

The impact upon the residential customer cannot be minimized. Customers of Consumers Energy system have experienced the price for natural gas go from $2.84 a thousand cubic feet in 2000 to currently $5.18 per thousand cubic feet. The increase of gas prices we are experiencing today could unleash a fire storm of protest in the fall and winter of this coming season as many consumers see their natural gas bills double. Families will again be forced to make active decisions among paying the gas bill, paying the mortgage, or saving for future college educations. State regulators will be facing rate hike requests by utilities that will need to pass these price increases on to customers.

Fortunately, this Congress has supported programs to assist the most needy through the LIHEAP program. This program provides needed financial assistance to pay heating bills, especially senior

citizens on a fixed income and those citizens caught between living comfortably and living day to day.

Last month, Federal Reserve Board Chairman Alan Greenspan emphasized the contradictions in Federal policies that have led to us where we are now, policies that promote increased use of natural gas particularly for electric power generation while clamping down on access to supply. We look forward as well to hearing the Chairman's comments today.

We are in a growing market, and the demand for natural gas in the United States is expected to increase 50 percent in the 2015 to 2020 timeframe. In Michigan, more than 4,600 megawatts of new generation that is exclusively gas fired has come on line just since 2000. This represents a 20 percent increase in in-State electric generation supply, all fueled by natural gas.

The natural gas industry is definitely at a crossroads. It is incumbent upon industry and policymakers to make the right choices.

The House should be commended for taking positive action in April by passing an energy bill that supports increasing supply. We also congratulate the House for addressing the energy tax issues and allowing for accelerated depreciation of natural gas distribution lines. This legislation will serve as a down payment on America's energy future.

To wholly secure that future, AGA has developed a list of prioritized proposed solutions: First and foremost, the smart, safe, and environmentally responsible exploration of untapped resources in several areas of the United States. In addition, we also need an increased focus on nontraditional energy sources, such as liquefied natural gas.

The complete detailed list of the solutions is in my written testimony. We have the technology, the ingenuity and the drive to succeed. I am confident that if we use the opportunities before us today we will make the right decisions for the future and for tomorrow. Thank you.

[The prepared statement of Carl L. English follows:]

PREPARED STATEMENT OF CARL ENGLISH, PRESIDENT AND CHIEF EXECUTIVE OFFICER, CONSUMERS ENERGY ON BEHALF OF THE AMERICAN GAS ASSOCIATION

Good morning. I am Carl English, President & Chief Executive Officer—Gas of Consumers Energy in Jackson, Michigan. I am testifying today on behalf of the American Gas Association in Washington, D.C. ("AGA") and its natural gas utility members. AGA is grateful for the opportunity to share its views with you on the critical importance to the nation of ensuring ample natural gas supplies at competitive prices. Doing so is necessary for the nation—both to protect consumers and to address the energy and economic situations we currently face.

AGA is composed of 191 natural gas distribution companies, which deliver gas throughout the United States. Local gas utilities deliver gas to more than 64 million customers nationwide. AGA members deliver approximately 83 percent of this natural gas.

Our members are charged with the responsibility, under local law or regulation, of acquiring natural gas for the majority of their customers and delivering it in a safe and reliable manner. Last year, this Committee addressed the safety issue by taking a balanced approach to the important issue of pipeline safety, and we thank you, Mr. Chairman and members of the committee, for having done so. Safety is a critical issue for the industry. Likewise, today having an ample supply of natural gas at reasonable prices is a critical issue for AGA and its members. AGA members and the consumers they serve share both an interest and a perspective on this subject.

It is important for you to understand that the bread and butter business of AGA members is acquiring and delivering natural gas to residential, commercial, and industrial consumers across America. Our members remain economically viable by delivering natural gas to consumers at the lowest reasonable price, which we do by operating our systems—over a million miles of distribution lines—as efficiently as possible. Exploring for and producing natural gas is the business of our energy-industry colleagues in the oil and gas business, whether they are major, independent, or "Mom and Pop" operators. We are not here to speak for them today, but their continued success in providing natural gas to America's consumers is of the utmost importance to us as well. Today we are here to speak for consumers who want reasonable heating bills and good jobs.

AGA is encouraged that Congress is addressing this increasingly critical issue. Earlier this year we were privileged to testify before both the Senate Energy and Natural Resources Committee and the House Resources Committee with regard to the challenging issue of natural gas supply. We also are gratified that H.R. 6, the Energy Policy Act of 2003, which was passed by the House of Representatives in April, 2003, contains a wide array of provisions designed to bring forth more of America's prodigious supply of natural gas to benefit consumers. That bill is without question more focused on natural gas supply than were the iterations under consideration in 2001 and 2002.

Adequate natural gas supply 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 two 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.

AGA wishes to commend the leadership of the Committee for convening this important hearing so promptly upon the heels of the passage of H.R. 6. To be sure, there has been a crescendo of public policy discussion with regard to natural gas supply since the "Perfect Storm" winter of 2000-2001. Nevertheless, in the several weeks since AGA last testified on Capitol Hill—in February and March of this year—the volume and the tenor of this discussion have increased dramatically. Simply put, this issue becomes more critical with every passing day.

Since the beginning of this year, natural gas has been trading in wellhead markets throughout the nation at prices floating between $5 and $6 per thousand cubic feet. This has not been a "price spike" of the sort that we have seen in the past lasting several days or perhaps several weeks. Rather, it has been sustained over a period of several months. And there is no sign that it will abate in the near future. Indeed, quotes for futures prices on NYMEX over the next 24 months have reached a consistent record level mirroring current cash prices.

In the course of the last several months, business consumers of natural gas have been raising a cry of concern over natural gas prices. And this concern has touched businesses of all stripes. In Connecticut, for example, pizza shops complain that their natural gas bills have increased $500-700 per month. The chemical and pharmaceutical industry, which uses 10% or more of the U.S. gas supply annually, has been reeling from increased natural gas prices. It has been projected that the chemical industry in Louisiana will lose at least 2,000 jobs as a result of high gas prices. Similarly, a major chemical company in Mississippi has declared bankruptcy, citing natural gas prices. That industry needs gas prices between $2.50 and $3.00 per thousand cubic feet to remain competitive on the world stage, while prices since the beginning of the year have been averaging in the range of $5.00 per thousand cubic feet. Similarly, fertilizer plants, where natural gas can represent 80% of the cost structure, are closing one facility after another. Glass manufacturers, which also use large amounts of natural gas, have reported earnings falling by 50% 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.

Businesses and factories tend to purchase most of their own gas, and they very quickly feel increases in prices. Residential customers, in contrast, typically rely upon their local utilities to act as merchants on their behalf. As a result of the manner in which state-approved regulatory mechanisms operate, most consumers will not begin to feel current high gas prices for months.

From the point of view of the residential consumer, some families will pay hundreds of dollars more to heat their homes this winter, which will be hundreds less to spend on other things. Families will again be 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. This winter the potential price increases will affect all families—

those on fixed income, the working poor, and the lower-income group as well as those caught between living comfortably and living day to day.

The level of gas prices we are experiencing today could unleash a firestorm of protest in the fall and winter of this year as some consumers may see their natural gas bills double. The next twelve months may make the winter of 2000-2001 look tame from the perspective of consumers, regulators, and legislators. Some forward-looking state public utility commissions, having learned from the 2000-2001 experience, are beginning to express concern over the possible impact of the winter of 2003-2004. We are pleased that Ohio Public Utility Commissioner Donald Mason is here today to express those concerns. The Secretary of Energy has also called for an extraordinary meeting of the National Petroleum Council to address the situation.

These are but the first few alarms in what seems likely to become a very difficult year. Moreover, unless we make the proper public policy choices—and quickly at that—we will be facing an even more difficult several years.

The natural gas industry is presently at a critical crossroads. The question before you today is: What will that crossroads look like? Will it look like a brand new interstate highway? Or will it look like a 100-car collision on a Los Angeles freeway?

For the past three years, natural gas production has had to operate full-tilt to meet consumer demand. The "surplus deliverability " or "gas bubble" of the late 1980's and 1990's is simply gone. 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 are today, wide open.

The supply tightrope has brought with it several inexorable and unpleasant consequences—prices in the wholesale market have gone up and that market has become much more volatile. During the 2000-2001 heating season, for example, gas prices moved from the $2 level to approximately $10 and back again to nearly $2. In Michigan the average price of natural gas on the Consumers Energy system in 2000 was $2.84 per thousand cubic feet. In 2002 the price was $3.80. Today the charge is $5.18. Such volatility hurts consumers, puts domestic industry at a competitive disadvantage, closes plants, and idles workers. The winter of 2000-2001 made it abundantly clear to us (and to you as well) that consumers do not like these price increases and that they do not like the market volatility that is now an everyday norm. Unless significant actions are taken on the supply side, gas markets will remain tumultuous, and 64 million gas customers will suffer the consequences. Today's recurrent $5 price levels may represent a new, and regular, level of natural gas prices for the foreseeable future, although this prospect can be moderated with aggressive and enlightened public policy.

As gas utilities, we do have a number of programs in place to insulate consumers to some extent from the full impact of wholesale price volatility, but consumers must ultimately still pay the price that the market commands. We believe that there will be considerable economic and political pushback should natural gas prices stabilize at the current $5 level for anything but a brief period of time.

The problem that we face today is not simply one of finding means to meet current demands in the market for natural gas. Rather, we are in a growing market, and the demand for natural gas in the U.S. is expected to increase 50 percent by 2015-2020. Growth seems inevitable because gas is a clean, economic, domestic source of available energy. It does not face the environmental hurdles of coal and nuclear energy, the economic and technological drawbacks of most renewable energy forms, or the national security problems associated with imported oil.

A significant sector where growth is occurring is electric generation. Nationwide most new electric generation is expected to be gas fired. In Michigan more than 4,600 megawatts of new gas-fired generation has come online since 2000. This represents a 20% increase in the state's capacity.

The challenge for both government and industry is quite straightforward: to ensure that the current need for natural gas is met and that the future need for natural gas will also be met—both at reasonable and economic prices. There can be no responsible question that facilitating this result is sound public policy. Natural gas is abundant domestically, and natural gas is the environmentally friendly fuel of choice. Ensuring adequate natural gas supply will lead to reasonable prices for consumers, will dampen the unacceptable volatility of wholesale natural gas markets, will help keep the economy growing, and will help protect the environment.

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 where natural gas is already known to exist so gas can be pro-

duced on an economic and timely basis; (3) ensuring that the new infrastructure that will be needed to serve the market is in place in timely and economic fashion.

Natural gas—our cleanest fossil fuel—is found in abundance throughout both North America and the world. It currently meets one-fourth of the United States' energy needs. Unlike oil, about 99 percent of the natural gas supplied to U.S. consumers originates in the United States or Canada.

The estimated natural gas resource base in the U.S. has actually increased over the last several decades. In fact we now believe that we have more natural gas in the U.S. than we estimated twenty years ago, notwithstanding the production of between 300 and 400 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. But having the natural gas is not the same as making that 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 our industry. We are able today to drill for gas with dramatically greater success and with significantly reduced environmental impact than we were able to do twenty 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 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.

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 our 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, while it may take forty more 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 U.S. 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 also tend to have short lives and significantly more rapid rates of decline in production than is the case with onshore wells.

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 and why the winter of 2000-2001 may become a regular occurrence, particularly at the point the economy returns to its full vigor. Having the winter of 2000-2001 return every year will undoubtedly put 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 of the tiller or to wait three or four more years to push it over full. Rather, we must come full about, 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. And, as I hope you do understand, 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 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 U.S. 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 se-

verely restricted. The potential for increased production of natural gas is severely constrained so long as these restrictions remain in place.

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 was restricted from development to some degree, some partially and some 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 ten years is located just north of the US/Canada border in eastern Canada 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 the offshore Atlantic area to have 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 back 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, to new fields, in both the U.S. 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.

Quite simply, we do not believe that there is any way other than exploring for natural gas in new geographic areas to meet America's anticipated demand for natural gas unless we turn increasingly to sources located outside North America.

In the middle of the 20th century, when the postwar economy had begun its half-century climb and when natural gas became the fuel of choice in America, our colleagues in the producing business opened one new natural gas field after another in the mid-continent. In this era, it was not that difficult to produce a triple or a home run virtually every inning. As those fields developed, producers continued to hit a regular diet of singles and doubles, with the occasional triple or home run in new discovery areas. This same pattern in the mid-continent was repeated in the Gulf of Mexico. Today, however, it is extremely difficult to find the new, open areas where the producing community can continue to hit the ball. As things are today, America has confined them to a playing field where only bunts are permitted. The Yankees did not get to the World Series playing that kind of game.

AGA does not advance such a thesis lightly. Over the past two years both the American Gas Association and the American Gas Foundation have studied this important issue vigorously. We have believed for several years that it is necessary that policy makers embrace this thesis so that natural gas can continue to be—as it has been for nearly a century—a safe and reliable form of energy that is America's best energy value and its most environmentally benign fossil fuel. We think that events in gas market in 2003 underscore that our concerns have been on the mark.

When the first energy shock transpired in the early 1970s, the nation learned, quite painfully, the price of dependence upon foreign sources of crude oil. We also learned, through long gasoline lines and shuttered factories, that energy is the lifeblood of our economy. Yet thirty years later we are even more dependent upon foreign oil than we were in 1970. Regrettably, the nation has since failed to make the policy choices that would have brought us freedom from undue dependence on foreign-source energy supplies. We hope that the nation can reflect upon that thirty-year experience and today make the correct policy choices with regard to its future natural gas supply. We can blame some of the past energy problems on a lack of foresight, understanding, and experience. We will not be permitted to do so again.

Meeting our nation's ever-increasing demand for energy has an impact on the environment, regardless of the energy source. The challenge, therefore, is to balance these competing policy objectives realistically. Even with dramatic improvements in the efficient use of energy, U.S. energy demand has increased more than 25 percent since 1973, and significant continued growth is almost certain. Satisfying this en-

ergy demand will continue to affect air, land and water. A great American success story is that, with but five percent of the world's population, we produce nearly one-third of the planet's economic output. And energy is an essential—indeed critical—input for that success story both to continue and to grow.

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 today accomplished through sophisticated technologies and methodologies that are cleaner, more efficient and much more environmentally sound than those used in the 1970s. It is unfortunate that many restrictions on natural gas production have simply not taken account of the important technological developments of the preceding thirty years. The result has been policies that deter and forestall increased usage of natural gas, which is, after all, the nation's most environmentally benign and cost-effective energy source.

Natural gas consumers enjoyed stable prices from the mid-1980s to 2000, with prices that actually fell when adjusted for inflation. Today, however, the balance between supply and demand has become extremely tight, creating the tightrope effect. Even small changes in weather, economic activity or world energy trends result in wholesale natural gas price fluctuations. We saw this most dramatically in the winter of 2000-2001. We may be seeing it today on a longer-term basis.

In the 1980s and 1990s, when the wholesale (wellhead) price of traditional natural gas sources was around $2 per million British thermal units, natural gas from deep waters and Alaska, as well as LNG, may not have been price competitive. However, most analysts suggest that these sources are competitive when gas is in a $3.00 to $4.00 price environment. Increased volumes of natural gas from a wider mix of sources will be vital to meeting consumer demand and to ensuring that natural gas remains affordable.

Increasing natural gas supplies will boost economic development and will promote environmental protection, while achieving the critical goal of ensuring more stable prices for natural gas customers. Most importantly, increasing natural gas supplies will give customers—ours and yours—what they seek—reasonable prices, greater price stability, and fuel for our vibrant economy. However, without policy changes with regard to natural gas supply, as well as expansion of production, pipeline and local delivery infrastructure for natural gas, the natural gas industry will have difficulty meeting the anticipated 50 percent increase in market demand. Price increases, price volatility, and a brake on the economy will be inevitable.

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 99 percent of U.S. gas supply comes from traditional land-based and offshore supply areas in North America. But, 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 1 percent of the gas consumed in the U.S., 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 US gas markets in the future. It will certainly not be as large a contributor as imported oil (nearly 60 percent of US oil consumption), but it could account for 10-15 percent of domestic gas consumption 15-20 years from now if pursued aggressively and if impediments are reduced.

Third, we must tap the huge potential of Alaska. Alaska is estimated to contain more than 250 trillion cubic feet—enough by itself to satisfy US natural gas demand for more than a decade. Authorizations were granted twenty-five years ago to move gas from the North Slope to the Lower-48, yet no gas is flowing today nor is any transportation system yet 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 US 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 15 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 lay ahead in the United States.

RECOMMENDATIONS

To promote meeting consumer needs, economic vitality, and sound environmental stewardship, the American Gas Association urges the Congress as follows:

- Current restrictions on access to new sources of natural gas supply must be re-evaluated in light of technological improvements that have made natural gas exploration and production more environmentally sensitive.
- Federal and state officials must take the lead in overcoming the pervasive "not in my backyard" attitude toward energy infrastructure development, including gas production.
- Interagency activity directed specifically toward expediting environmental review and permitting of natural gas pipelines and drilling programs is necessary, and agencies must be held responsible for not meeting time stipulations on lease, lease review, and permitting procedures.
- Federal lands must continue to be leased for multi-purpose use, including oil and gas extraction and infrastructure construction.
- Both private and public entities should act to educate the public regarding energy matters, including energy efficiency and conservation. Federal and state agencies, with private sector support and involvement, should strive to educate the public on the relationship between energy, the environment and the economy. That is, energy growth is necessary to support economic growth, and responsible energy growth is compatible with environmental protection.
- Economic viability must be considered along with environmental and technology standards in an effort to develop a "least impact" approach to exploration and development but not a "zero impact".
- Existing moratoria for onshore lands should be lifted.
- The geologic conditions for oil and gas discovery exist in the US mid-Atlantic area, the Pacific Offshore area, and the eastern portion of the Gulf of Mexico.
  - Although some prospects have been previously tested, new evaluations of Atlantic oil and gas potential should be completed using today's technology—in contrast to that of 20 to 30 years ago.
  - The federal government should facilitate this activity by lifting or modifying the current moratoria regarding drilling and other activities in the Atlantic Offshore, in the Pacific Offshore, and in the Gulf of Mexico to ensure that adequate geological and geophysical evaluations can be made and that exploratory drilling can proceed.
  - The Destin Dome (181 lease area) should immediately be offered for lease for oil and gas exploration.
  - The federal government must work with the states to assist—not impede—the process of moving natural gas supplies to nearby markets should gas resources be discovered in commercial quantities. Federal agencies and states must work together to ensure the quality of the environment but they must also ensure that infrastructure (such as landing an offshore pipeline) is permitted and not held up by multi-jurisdictional roadblocks.
- The Federal government should continue to permit royalty relief where appropriate to change the risk profile for companies trying to manage the technical and regulatory risks of operations in deepwater.
- Tax provisions such as percentage depletion, expensing geological and geophysical costs in the year incurred, Section 29 credits, and other credits encourage investment in drilling programs, and such provisions are often necessary, particularly in areas faced with increasing costs due to environmental and other stipulations.
- The Coastal Zone Management Act (CZMA) is being used to threaten or thwart offshore natural gas production and the pipeline infrastructure necessary to deliver natural gas to markets in ways not originally intended. Companies face this impediment even though leases to be developed may be 100 miles offshore. These impediments must be eliminated or at least managed within a context of making safe, secure delivery of natural gas to market a reality.
- The U.S. government should work closely with Canadian and Mexican officials to address the challenges of supplying North America with competitively priced natural gas in an environmentally sound manner.

- Renewable forms of energy should play a greater role in meeting U.S. energy needs, but government officials and customers must realize that all forms of energy have environmental impacts.
- Construction of an Alaskan natural gas pipeline must begin as quickly as possible.
  - Construction of this pipeline is possible with acceptable levels of environmental impact.
  - The pipeline project would be the largest private sector investment in history, and it would pose a huge financial risk to project sponsors. Many believe the project may not be undertaken without some form of federal support.
- The Federal Energy Regulatory Commission (FERC) announced in December of 2002 that it would not require LNG terminals to be "open access" (that is, common carriers) at the point where tankers offload LNG. This policy will spur LNG development because it reduces project uncertainty and risk.
- Other federal and state agencies should review any regulations that impede LNG projects and act similarly to reduce or eliminate these impediments.
- Efforts should be made to encourage existing LNG terminals to commence operating at full capacity at the earliest opportunity.
- The siting of LNG offloading terminals is generally the most time consuming roadblock for new LNG projects. Federal agencies should take the lead in demonstrating the need for timely approval of proposed offloading terminals, and state officials must begin to view such projects as a means to satisfy supply and price concerns of residential, commercial and industrial customers.
- Some new LNG facilities should be sited on federal lands so that permitting processes can be expedited.
- Congress should increase LIHEAP funding. Low-income energy assistance is currently provided to roughly 4 million households, only 15 percent of those eligible. The financial burden on needy families will certainly increase this winter, and LIHEAP appropriations should be increased to $3.4 billion—up from $2.0 billion of total assistance in 2003
- Should gas supplies become extremely tight, the federal government and the states should consider easing environmental restrictions on a temporary basis so that electric generating facilities and industrial facilities can switch to alternative fuels.
- States should be encouraged to authorize local utilities to enter into fixed-price long-term contracts and to enter into natural gas hedging programs as a means to dampen the impact of natural gas price volatility upon consumers.

Chairman TAUZIN. Thank you, Mr. English.

The Chair now recognizes Mr. Robert Liuzzi, the President and CEO of CF Industries, on behalf of the Fertilizer Institute which for the record uses natural gas as a raw material source, not just as a power source.

Mr. Liuzzi.

STATEMENT OF ROBERT C. LIUZZI

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

The situation that the opening remarks addressed, the volatility in the level of price, has created an extremely bad situation for the nitrogen fertilizer business. The situation has resulted in the closure of 20 percent of U.S. nitrogen capacity and another 25 percent has been idled. I am here to urge the Congress and this committee to take action on a comprehensive energy policy to deal with the issue.

CF is a farmer-owned cooperative. We are one of the largest nitrogen producers in North America. We operate large facilities in Donaldsonville, Louisiana, and Alberta, Canada. In Louisiana, we employ over 500 people on a full-time basis, which accounts for $46 million a year in wages, $8 million in sales and property taxes. During a normal production year, the facility converts 78 million BTUs of natural gas into 2.25 million tons of ammonia, 1 and three

quarter million tons of urea and over 2 million tons of nitrogen solution.

CF Industries through its members accounts for one-fourth of all nitrogen applied to the ground in the United States and one-third of all the nitrogen used in the Midwest. Through our owners, our phosphate and nitrogen products reach a million farms and ranches in 48 States and two Canadian Provinces.

As the chairman mentioned, we are slightly different than testimony previously. Natural gas is my raw material, my feedstock. It is—the primary product we make, anhydrous ammonia and gas, accounts for 90 percent of the total cash cost of ammonia production. Ammonia is also the basic building block for dry nitrogen such as urea and nitrogen solutions. It is also a raw material for ammoniated phosphatic fertilizers.

Because it is the raw material of the feedstock, the current situation is having a devastating impact on our business. As you are aware, prices began to steadily increase in early 2000, rising to almost $10 per million BTUs in January of 2001. You can imagine what that did to fertilizer production costs.

Not surprisingly, in response, the industry began to shut down production. Operating rates by the end of January in 2001 had dropped to a low of 46 percent. That compares to an average operating rate during the 1990's of about 92 percent. We saw moderation after that, but then we saw escalation again. February of this particular year, spot natural gas prices soared to a record high of almost $20 per million BTUs. Although they again moderated, they remain well above historical averages. As I mentioned, we have suffered permanent closures and protracted idling of facilities.

What does this all mean to fertilizer manufacturers or to U.S. agriculture? During the 1990's, about three-quarters of all nitrogen consumed in America was supplied by domestic production, 15 percent came from Canada, and 10 to 15 percent was sourced offshore. Plant closures affect rural economies. Chemical operating jobs are very high-paying jobs. The continued scenario of high prices for gas undoubtedly will lead to more closures and abandonment of the infrastructure and the people that support the fertilizer business.

One of the most disturbing aspects of this particular situation is that it has created for U.S. farmers an issue of reliability of supply. Imports cannot come in to fill the gap that will result from permanent closure of plants in the United States.

The infrastructure even on the Gulf Coast, Mr. Chairman, is not sufficient to bring product in from Russia or other places, move it through the inland waterway system and get it where it is needed when it is needed, a short planting period that uses large amounts of fertilizer.

Furthermore, imports will not lower prices to American farmers. U.S. Plants will run as long as they can cover their cash cost to production. The U.S. producer is the marginal supplier to the U.S. market, and consequently imports will be priced just under that level.

Congress, we believe, has to adopt, as everyone has said already, a two-pronged approach. We have got to expand supply, whether that is drilling in areas that are currently prohibited in various parts of the gulf, and we have got to curtail an artificially induced

demand, particularly for electric power generation. Going forward, 90 percent of all power plants will burn natural gas.

I am running over, Mr. Chairman. I thank you for the opportunity to be here. I will say that all the others have adequately summarized many aspects of my testimony. It is all in the record. Thank you, sir.

[The prepared statement of Robert C. Liuzzi follows:]

PREPARED STATEMENT OF ROBERT C. LIUZZI, PRESIDENT, CF INDUSTRIES, INC. ON BEHALF OF THE FERTILIZER INSTITUTE

On behalf of The Fertilizer Institute, CF Industries, Inc. is pleased to have the opportunity to discuss the urgent situation currently facing the U.S. fertilizer industry. The volatility and level of U.S. natural gas prices, virtually unprecedented in the history of our country, has resulted in the permanent closure of almost 20% of U.S. nitrogen fertilizer capacity and the idling of an additional 25%. This situation threatens to destroy an efficient U.S. industry and displace the thousands of workers who support it. Congress must pass a comprehensive energy policy that addresses both the supply and demand aspects of the natural gas market. This is crucial to the long-term survivability of the U.S. fertilizer industry.

The Fertilizer Institute (TFI) represents fertilizer from the plants where it is produced to the plants where it used—and all points in between. Producers, retailers, trading firms and equipment manufacturers, which comprise TFI's membership, are served by a full-time Washington, D.C., staff in various legislative, educational and technical areas as well as with information and public outreach programs.

As a general background, CF Industries is a farmer-owned cooperative and is one of the largest nitrogen fertilizer producers and marketers in North America. The Company is headquartered in Long Grove, Illinois. CF operates world-scale production facilities in Donaldsonville, Louisiana, and Medicine Hat, Alberta, Canada. In Louisiana, CF currently employs 507 full-time and contract workers. This facility accounts for $46 million a year in wages and $8 million in sales and property taxes. During a normal production year, the facility converts approximately 78 million MMBtu of natural gas into 2.25 million tons of ammonia, 1.75 million tons of urea, and 2.15 million tons of UAN. The Complex has a daily requirement of over 200 million cubic feet of natural gas as a feedstock and fuel.

CF and its Member cooperatives account for approximately one-fourth of the nitrogen fertilizers applied in the United States and approximately one-third of the nitrogen fertilizers applied in the primary growing areas of the Midwest. The Company also mines and manufactures phosphate fertilizers in Hardee County and Plant City, Florida. Through its eight Member-owners, CF's nitrogen and phosphate fertilizer products reach one million farmers and ranchers in 48 states and two Canadian provinces.

My purpose today is to discuss the devastating impact that the high level and unprecedented volatility in natural gas prices is having on both the fertilizer industry and the American farmer. To fully understand why increased and volatile natural gas prices are creating such fundamental difficulties for the nitrogen fertilizer industry, a basic understanding of our products and manufacturing process is necessary.

Natural gas is the primary feedstock in the production of virtually all commercial nitrogen fertilizers in the United States (Figure 1). And it is important to be very clear about this: natural gas is not simply an energy source for us; it is the raw material from which nitrogen fertilizers are made. Our production process involves a catalytic reaction between elemental nitrogen derived from the air with hydrogen derived from natural gas. The primary product from this reaction is anhydrous ammonia (NH3). Anhydrous ammonia is used directly as a commercial fertilizer or as the basic building block for producing virtually all other forms of nitrogen fertilizers such as urea, ammonium nitrate and nitrogen solutions, as well as diammonium phosphate and mono-ammonium phosphate. Natural gas is also used as a process gas, an energy source, to generate heat when upgrading anhydrous ammonia to urea, but this use is minor compared to our use of natural gas as a raw material.

$$\text{Natural Gas } (CH_4) \;+\; \text{Air } (N_2) \;\rightarrow\; \text{Anhydrous Ammonia } (NH_3)$$

Because natural gas is the only economically feasible raw material used in producing nitrogen fertilizers, it is by far the primary cost component. Today, in the case of ammonia, natural gas accounts for 90% of the total cash cost of production (Figure 2).

Given this heavy reliance on natural gas, the volatility of natural gas prices continues to have a devastating impact on the domestic fertilizer industry. This can be clearly demonstrated by comparing natural gas costs, production costs and U.S. nitrogen fertilizer operating rates. As you are well aware, natural gas prices began to steadily increase during calendar year 2000, rising from an average of $2.36 per MMBtu in January to over $6.00 per MMBtu in December, 2000 and to a record $10 per MMBtu in January 2001 (Figure 3). In turn, this forced fertilizer production costs to unprecedented levels. Ammonia production costs, for example, spiked up from approximately $100 per ton to $170 by June 2000, to $220 per ton in December, and to an average of over $350 per ton in January 2001.

Not surprisingly, the industry began to shut down production in response (Figure 4). By the end of December 2000, the U.S. nitrogen operating rate fell to below 70% of capacity. By the end of January 2001, operating rates dropped to an all-time low of only 46%. To put this into perspective, the average U.S. operating rate during the 1990s was 92% (Figure 5).

Following this natural gas spike, gas prices began to moderate and by mid-2001 had fallen back to historic levels. In response, idled capacity in the U.S. quickly came back on-stream, and the industry operating rate climbed to just under 90% of capacity.

Unfortunately, the lower natural gas prices and higher operating rates were short-lived. By mid-year 2002, natural gas prices once again began to slowly escalate until February 26, 2003, when spot natural gas prices suddenly spiked to a record high of over $20 per MMBtu. Although natural gas prices again quickly moderated, they have remained well above historic averages. Gas prices over the last month, for example, have been trading in the $5.50-$6.50 range—approximately 150% above the 1990s historic average of $2.40.

The sharp rise in natural gas prices and the resulting curtailment of U.S. fertilizer production also has had a dramatic impact on fertilizer prices throughout the marketing chain and, in particular, at the farm level. Nitrogen prices at the farm level, for example, jumped this year to near-record high levels. According to USDA data, the U.S. average farm-level price for ammonia jumped this spring to $373 per ton compared to an average spring price last year of $250. Similarly, urea prices have climbed from $191 to $261 and UAN prices from $127 to $161. This translates into an increase in cost to a typical Midwest corn farmer of $10 to $15 per acre (Figure 6).

Unfortunately, there appears to be no end in sight. According to Department of Energy (DOE) Secretary Abraham, current stocks of natural gas are low due to a combination of cold weather and declines in both domestic production and net imports. The 696 billion cubic feet of gas in storage this spring represented the lowest level since 1976, when the Energy Information Agency began keeping records. Storage has increased since that time, but it is still only half the level of a year ago, and 42% below the previous five-year average. According to most industry analysts, the current tight inventory situation will likely keep natural gas prices at extremely high levels throughout the remainder of this year and into next year.

Absent a substantial long-term reduction in natural gas prices, the U.S. nitrogen fertilizer industry and, therefore, farm-level supply is at serious risk. Of the 20 million tons of ammonia capacity that existed in the U.S. prior to 2000, approximately 3.5 million tons have already been permanently closed. According to a recent study completed by Fertecon, (Figure 7) the world's largest fertilizer consulting company, another four million tons is at risk of closing within the next two years. In addition, it is anticipated that the remainder of the industry will likely operate on a "swing basis." That is, plants will only run when natural gas prices are low enough and/or fertilizer prices are high enough that producers can, at a minimum, cover their cash costs of production (Figure 8).

So what does all of this mean to American fertilizer manufacturing and for U.S. agriculture? To fully answer that question, it is necessary to provide some additional background information. Since the 1940s, when commercial fertilizers were introduced into the market on a large-scale basis, farm demand for nitrogen fertilizers was always supported by a large, efficient, domestic fertilizer industry. During the 1990s, for example, approximately 70-75% of the nitrogen fertilizers consumed by American farmers was supplied by domestic production with another 15% supplied from nearby Canadian plants. The remaining 10-15% of the volume was sourced from offshore suppliers (Figure 9).

At the heart of the domestic fertilizer industry are production facilities designed to manufacture fertilizer products annually at full capacity. Many of these facilities are located near the source of raw materials but far from the major consuming regions. Furthermore, it is important to understand that most U.S. nitrogen fertilizer is consumed within a very short time frame in the fall and spring application sea-

sons. As a result, an extensive distribution and storage infrastructure has been developed over the years to bridge this geographic and seasonal gap to ensure that American farmers would have adequate supplies at the right time. This system is specifically designed to move and handle large volumes of product from domestic production sites to the major consuming areas. Thus, the distribution and storage infrastructure is purposely integrated into the domestic production system to ensure efficiency, economies of scale and reliability of supply.

Domestic fertilizer manufacturing facilities have historically provided top-paying jobs and additional employment opportunities in local communities. According to a recent Baton Rouge Advocate article [1], jobs in chemical manufacturing are at the top of the pay scale among Louisiana manufacturers. The average chemical industry wage in February was $25.23 per hour, with a 44.2-hour workweek producing $1,115 per worker per week, compared to a general manufacturing wage of $17.63 per hour or $756 on a 42.9-hour workweek. Chemical industry jobs also have a high multiplier effect. In East Baton Rouge Parish, for example, each chemical job is estimated to support another 4.6 positions in the overall job market.

A scenario of continued high natural gas prices will undoubtedly lead to more U.S. plant closures and abandonment of marginally profitable infrastructure in rural communities. While higher volumes of imports will fill part of the potential loss in U.S. supply, domestic production and distribution must remain viable to fully meet farmer demand. Because the current distribution and storage system within the U.S. was constructed around a U.S. supply base, there is limited infrastructure to off-load, store and transport larger and larger volumes of imports. The lack of infrastructure is particularly apparent for anhydrous ammonia, which requires refrigerated or pressurized tanks, pipelines, railcars and barges. Massive new investment and considerable lead-time will be needed if the existing infrastructure assets are left permanently stranded. Much like the proposed improvements to liquefied natural gas infrastructure, restructuring the domestic fertilizer distribution system to efficiently handle adequate levels of imports will be on a decennary time scale.

The answer is not simply to say that we will just rely on imported fertilizer. Increased reliance on imports would also result in a considerable increase in the potential for supply and price volatility. The vast majority of the U.S. industry was constructed to meet U.S. demand. Offshore supply, on the other hand, was largely constructed to opportunistically compete in a world market. In other words, putting aside unfairly traded product, cargoes are generally sold and shipped to those international markets that will yield the highest netback prices. Imports are also subject to changes in world economic conditions, fluctuating exchange rates and political and/or policy changes in other countries.

Moreover, increased U.S. reliance on imports will not result in lower prices for U.S. farmers. Nitrogen fertilizers are a fungible commodity product for which prices are set by supply/demand conditions and, therefore, by the cash costs of the marginal producer. Under a continued environment of high natural gas costs, the marginal supplier to the market will be the U.S. producer. Consequently, higher import volumes will not translate to lower prices to U.S. farmers.

High natural gas prices present the most serious threat to the fertilizer sector, and to farmers in general, since the energy shocks of the 1970s. The fertilizer industry believes it is imperative that the U.S. develop a comprehensive and balanced energy policy—one that encourages the development of additional supplies and, at the same time, promotes the efficient use of a variety of energy sources and technologies.

More specifically, the fertilizer industry stresses that the most effective measure to deal with high natural gas prices over the short-term are incentives and other regulatory measures that will reverse decades of artificially induced demand for natural gas over other fuel technology for electric power generation. Congress itself is among those who share in the responsibility for this problem, as the requirements of the Clean Air Act have made it increasingly difficult to permit, construct and enlarge the nation's coal-fired plants. Where the nation once relied on coal for the lion's share of its electric power, over 90% of all new power plant construction intends to rely on natural gas. Recent proposals to impose further rules on mercury and CO2 emissions will only add to the burden of coal-fired generators and hasten the move to natural gas. This, of course, will cause a tremendous new demand to be placed on the existing gas supply base, ensure high prices into the foreseeable future, and threaten the viability of the domestic nitrogen fertilizer industry—an industry, unlike the electric power industry, that does not have an alternative to natural gas. Accordingly, any legislation passed by this Committee should ensure that

[1] Bongiorni, S. (2003, May 11). Overseas business threatens Louisiana's chemical industry. The Baton Rouge Advocate.

all coal, nuclear and hydroelectric plants are able to operate safely at their full capacity, and that incentives are provided and obstacles removed to ensure that new coal and nuclear facilities are constructed.

The fertilizer industry also supports a thorough review of those policies that severely restrict oil and gas production on multiple-use federal lands and large portions of the continental shelf. We believe that access to these reserves can be substantially beneficial towards meeting the Nation's energy needs without compromising other legitimate interests.

For those of us in the fertilizer industry, "the future is now." We encourage this Committee, the Congress, and the Bush Administration to continue to aggressively look for ways to even further expedite projects which not only increase supplies, but also help get supplies to the fertilizer industry in the near term. We think bold, creative initiatives are needed. In fact, we understand that domestic supplies are being found which cannot get to market because the delivery systems are just not there. Anything that this Committee, the Congress and the Administration can do to expedite the creation of new modes of delivery for untapped domestic natural gas supplies or to facilitate imports can help our industry in the immediate future. This can take the form of new pipelines and even more innovative solutions such as encouraging the development of the maritime transportation of natural gas in the form of compressed natural gas or CNG.

Specifically, I would like to commend this Committee and the Congress for its efforts just completed last year to facilitate the importation of new supplies of natural gas by enacting provisions of the Maritime Transportation Security Act of 2002 that created deepwater natural gas ports. This is an important first step in helping to increase natural gas availability in the United States and help to bring supply and demand back into better balance.

There is a deep-water port project right off the Louisiana coast that can come on-stream sooner rather than later because of its unique history. Freeport-McMoRan Sulphur LLC's permit is to be submitted in the next few months to the Coast Guard and other agencies for regulatory approval. Freeport is currently working to convert this massive offshore complex that once produced sulfur, to a deepwater natural gas port. The "Main Pass Energy Hub," will offload LNG from tankers and re-gasify the gas on the platforms formerly used for sulfur production. Since the facility is located on a giant salt dome—two miles across in diameter—Freeport envisions providing major storage facilities for the re-gasified gas in salt caverns created and accessed by wells drilled from the existing platforms. The Department of the Interior would regulate the storage, in offshore salt caverns, of natural gas produced from outside the waters of the Outer Continental Shelf (OCS); thereby enabling Freeport to store imported gas in salt caverns underlying OCS waters.

In addition to this unique project and to substantially increase the supply of natural gas in the market, we urge that Congress encourage the development and acceptance of the maritime transportation of natural gas in the form of compressed natural gas or CNG. As opposed to LNG, where natural gas (methane) is cooled and stored as a liquid, the CNG gas remains in the gaseous phase and is stored under such pressure so that it is compressed. This enables the transportation and storage of a much greater volume of gas.

Although the technology of maritime transport of LNG has become accepted for use in the waters of the United States, the technology of maritime transport of CNG is now under review. The potential for the acceptance of maritime transport of CNG to increase natural gas supplies is tremendous because it is less expensive and is within shorter distances than LNG to transport and re-gasify.

Its acceptance will enable the production and delivery to market of a gas produced in federal waters of the Gulf of Mexico that would otherwise be uneconomical to produce. Such gas may either be found underlying the shallow waters of the Gulf of Mexico where it is economically "stranded" due to distance from a pipeline. It may be associated with oil produced in the deep waters of the Gulf of Mexico, but is likewise stranded due to distance from a pipeline. As the oil is produced, the associated gas is pumped back into the geological formation from which it came due to the uneconomical nature of the process. The Department of the Interior has informed OCS producers that they may return this gas to the reservoir as long as they have a plan for producing it sometime in the future. The delivery of this gas, as well as gas produced from elsewhere nearby in the Western Hemisphere will be made economical with the approval of CNG transport in U.S. waters. We urge the acceleration of efforts to approve the use of this technology in U.S. waters.

We are in no position to be an expert on Freeport's project or any other specific project underway. Regardless, we must urge the Congress and the Administration to take a very close look and consider expediting permits for any project that can help save our industry and the jobs that we create. We are very excited about poten-

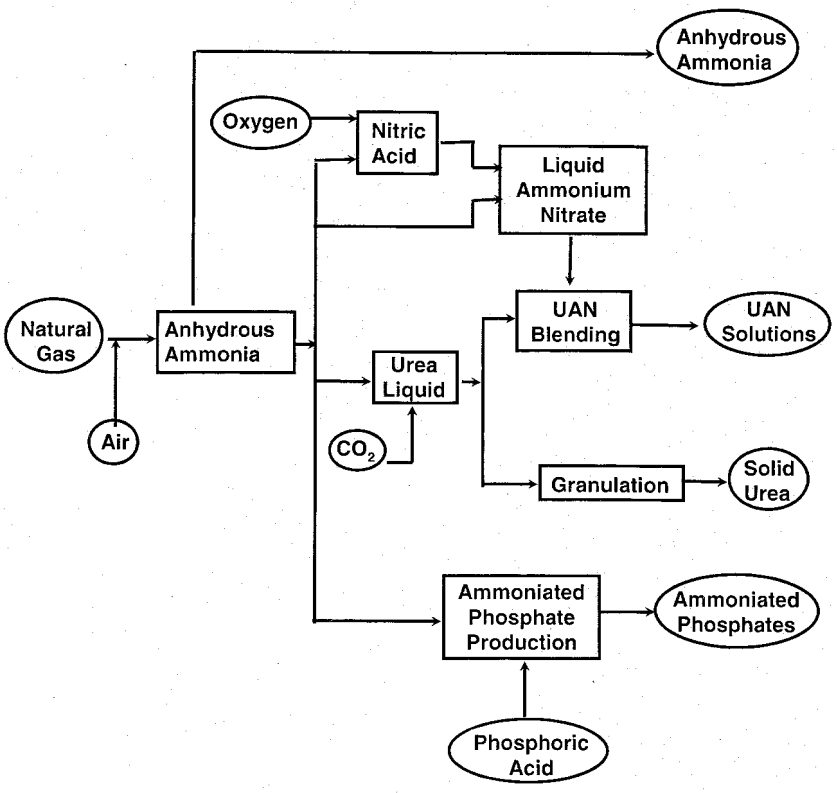
tial projects that would enhance the supply of gas coming to our Nation on an expedited basis.

In summary, the fertilizer industry believes that a balanced and comprehensive energy policy is not only long overdue, but also essential to the long-term viability of this strategic sector. It is also crucial to the American farmer, given that almost one-third of U.S. crop production is derived from nitrogen fertilizer (Figure 10).

Thank you for the opportunity to discuss these issues with you today. We look forward to working with you over the next few months, and I would be pleased to answer any questions you may have on the fertilizer industry and natural gas pricing issues.

Figure 1

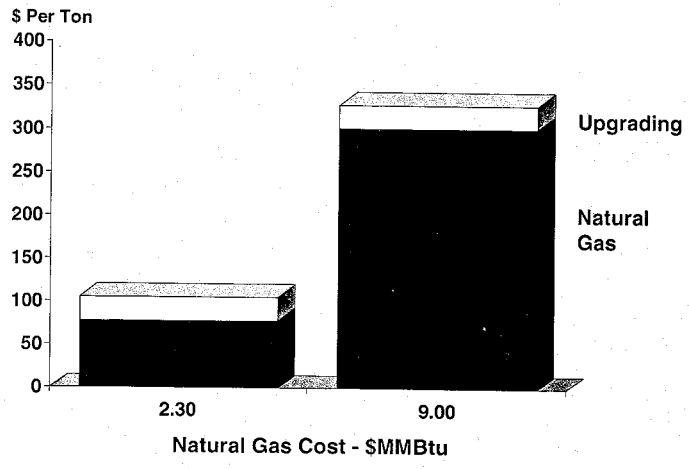
Nitrogen Fertilizer Production



Source: Fertilizer Manual – UNIDO/IFDC

Figure 2

Ammonia Cash Costs
FOB Plant Gate

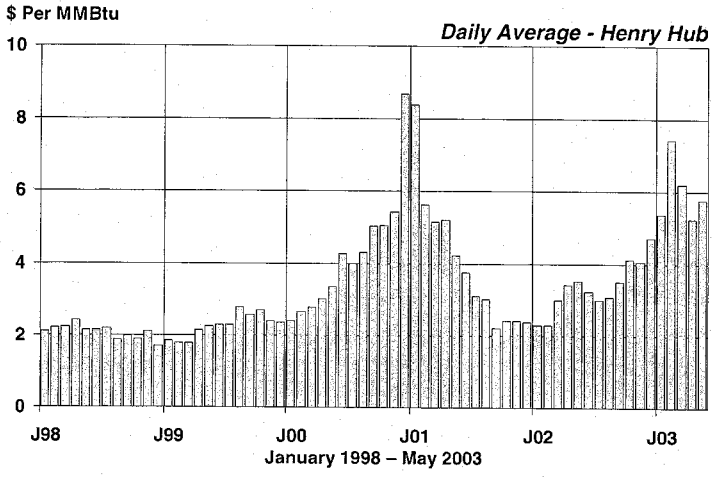


Natural gas is, by far, the primary cost component in producing nitrogen fertilizers, and in the case of ammonia, currently accounts for approximately 90 percent of total cash production costs.

Source: CF Industries, Inc.

Figure 3

U.S. Natural Gas Prices

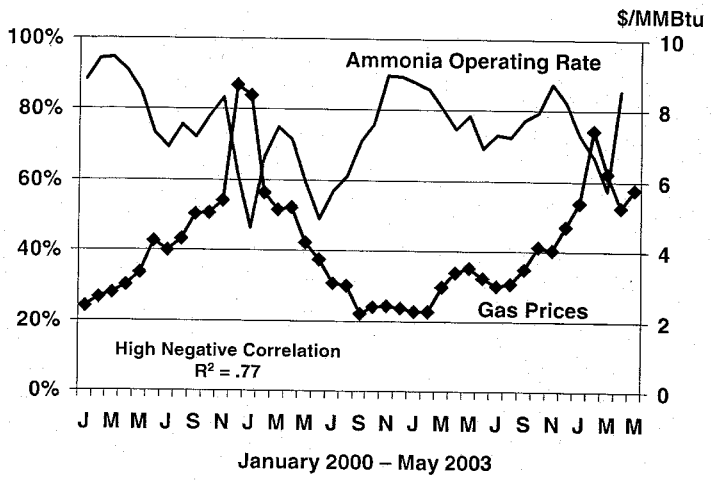


Since January 2000,
the cost of natural gas to the fertilizer industry
has been highly volatile.

Source: Platts Gas Daily

Figure 4

Ammonia Operating Rate vs. Natural Gas Prices

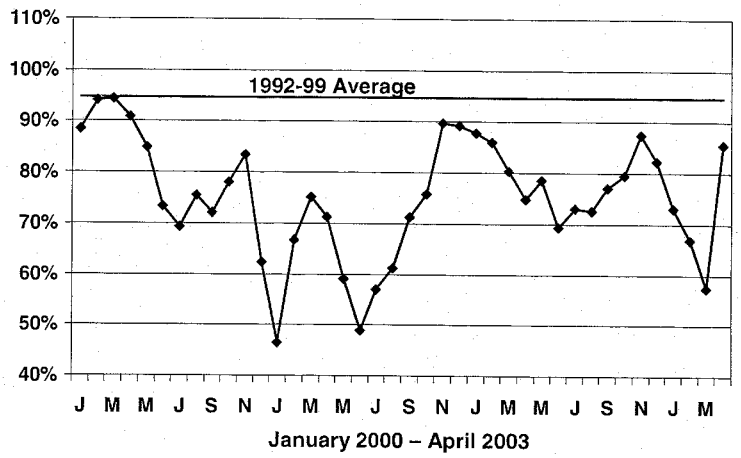


Since natural gas is the only raw material used in the production of nitrogen fertilizers, natural gas prices and the U.S. nitrogen operating rate are highly correlated.

Source: CF Industries, Inc.

Figure 5

U.S. Ammonia Operating Rate

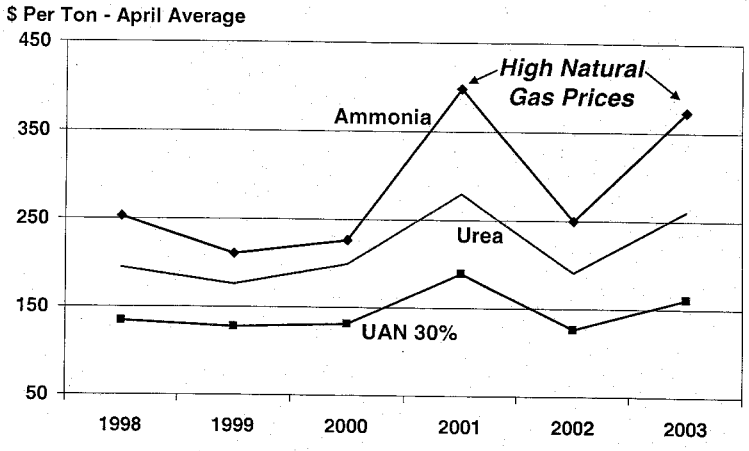


The sharp rise in natural gas cost has had a devastating impact on the operating rate of the U.S. nitrogen fertilizer industry.

Source: CF Industries, Inc., The Fertilizer Institute

Figure 6

U.S. Fertilizer Prices to Farmers



High production costs have forced nitrogen fertilizer prices up to record or near-record levels. Ammonia prices to farmers, for example, have almost doubled during the gas price spikes in 2001 and 2003.

Source: U.S. Dept. of Agriculture

Figure 7

Potential U.S. Ammonia Capacity Closures Due to High Natural Gas Prices

	Capacity (Million Product Tons)	Percent of Industry
Capacity in 1999	20.2	
Closures to Date	3.6	17.8%
Current Capacity	16.6	
Capacity at Risk	4.2	25.3%
Potential Capacity	12.4	

Source: Fertecon

Figure 8

U.S. Nitrogen Production Facilities Currently Idled

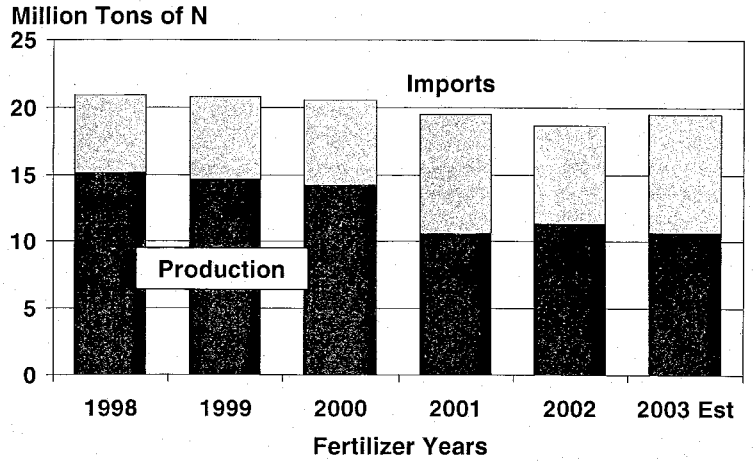
(000 Short Tons Product Per Year)

Company/Location	NH_3	Urea	UAN 32%
CF Industries			
Donaldsonville, LA	553	478	
IMC			
Faustina, LA (D'ville)	565		
Koch Nitrogen			
Enid, OK I	550		
Sterlington, LA I & II	1,100		
Mississippi Chemical			
Yazoo City, MS	175		
PCS			
Geismar, LA	530		1,149
Memphis, TN	410	440	
Royster-Clark			
East Dubuque, IL	335		374
Terra			
Verdigris, OK	565		2,050
Total	**4,783**	**918**	**3,573**

Source: Fertilizer Publications

Figure 9

U.S. Nitrogen Supply

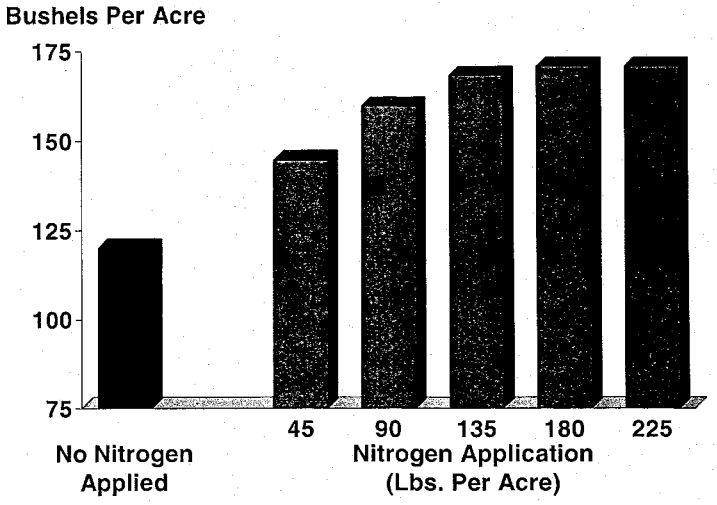


As a result of production cutbacks and high nitrogen prices, U.S. imports have jumped to record levels.

Source: Dept. of Commerce, The Fertilizer Institute

Figure 10

Corn Yield Response to Nitrogen - Illinois Average



Nitrogen is an essential plant nutrient. Consequently, any decline in nitrogen fertilizer consumption as a result of high prices will significantly affect crop yields and farm income.

Source: Bob Hoeft - University of Illinois

Chairman TAUZIN. Thank you very much, Mr. Liuzzi.

We are pleased to welcome Mr. Forrest Hoglund, Chairman and CEO of Arctic Resources Company of Houston Texas. Mr. Hoglund.

STATEMENT OF FORREST E. HOGLUND

Mr. HOGLUND. Thank you, Mr. Chairman and members of the committee. I appreciate the opportunity to testify today.

The most significant action that can be taken to improve natural gas supplies is defined as an economic and environmentally satisfactory way of accessing the 44 trillion cubic feet of proven reserves in Alaska and Canada and the 160 trillion cubic feet of Arctic gas potential. Let me assure you high-cost, mandated pipelines are not the answer. In fact, Congress is in the midst of playing local politics with the most important energy project in the United States.

The question of tapping Arctic gas has been around for a long time. Industry studied the situation in the mid-1970's and almost all companies agreed one northern route picking up Canadian and Alaskan gas was the way to go. Two longer and more expensive pipelines was not the answer. Unfortunately, Canada blocked the one pipeline answer at that time because aboriginal land claims were not in place.

Now the route question is back again; and our estimates show that the two-pipeline Alaskan approach is twice as long, goes through 900 miles of mountains and is twice the cost of the one-pipeline northern route—$14.6 billion versus $7.8 billion.

Not surprisingly, the major producers who want a subsidy don't agree. They say that the routes are close in cost, but that claim should be examined.

First of all, they say it would cost $20 billion to lay clear to Chicago. It doesn't appear that they need to go beyond Edmonton, Alberta; and that would save $5 billion.

Second, after they saw they might get subsidies, a $4 billion contingency was added to their northern route estimates, apparently the ice affecting summertime construction. We are proposing wintertime construction.

Also, they never mentioned the additional $3 billion needed for the Canadian pipeline segment.

The point that should be made is that there are regulatory bodies in the U.S. and Canada to decide these issues. Congress should not pick winners or losers on questionable one-sided data.

Who is for the Alaskan approach? The Alaskans, of course, and two major oil companies who think they can get others to accept the economic risk. They have convinced Congress to mandate their line even though the administration is soundly against it.

Also, Canada is not being included in the discussion when two-thirds of the Alaskan route goes through Canada. Canada has expressed strong opposition to subsidized natural gas from Alaska and lately has called for a bilateral commission to analyze the situation. They are in a position to block the projects and have given indications they might.

Why is Alaska so strongly behind the issue? They want the short-term construction jobs and profits, plus they would get natural gas to Fairbanks, and that is understandable if the costs weren't so huge. On the other hand, they would be giving up an

extra $4 to $5 billion in State revenue based on their own estimates due to higher royalty and severance taxes. They would get more long-term jobs for additional exploration and a better assurance of the project being completed.

There are a lot of things conceptually wrong with the current proposal being considered in the Senate.

First, why the mandate? Obviously, they are trying to preclude any other alternatives; and when a mandate is pushed all kinds of alarms ought to go off in everybody's ahead.

Second, the majors want debt guarantees of up to $18 billion to take the gas clear to Chicago, which is a gigantic overreach. Normal industry practice would be see how other intersecting pipelines near Edmonton could carry the gas to market utilizing any spare capacity and low-cost expansions available.

Third, the majors want a tax credit of up to 52 cents for MCF if the gas prices drop below $1.35 MCF. This basically guarantees them an 80 cent price. If they have gigantic cost overruns, like they did when they built the Alaskan oil pipeline, the $18 billion loan guarantee might be called, but the producers would still get their 80 cents. That is a pretty nice deal.

The proponents say this is similar to a section 29 tax credit. It is not at all. Section 29 credits are given when you need that to produce the resource. Here you have a cheaper alternative that you are trying to mandate out and not even consider.

The intellectual concept behind this U.S. House and Senate action is seriously flawed. People who agree include the Bush Administration, the Democratic Progressive Policy Institute, Taxpayers for Common Sense, the Wall Street Journal, the Washington Post, National Environmental Trust, CATO Institute, National Center for Policy Analysis and a large number of independent producers and associations.

What should be understood is that Alaska could be the key in getting this project done right. If they would agree to work for the most economic and best environmental pipeline, then industry and government would quickly get behind the right project. When the energy bill goes to conference I urge you to reconsider the House-passed route mandate and stay firmly against the need for tax subsidies for Alaskan gas. Let's pass an Energy Bill that will truly pave the way for development of Alaskan and other Arctic gas resources.

Thank you, Mr. Chairman.

[The prepared statement of Forrest E. Hoglund follows:]

PREPARED STATEMENT OF FORREST E. HOGLUND, CHAIRMAN & CEO, ARCTIC RESOURCES COMPANY

Chairman Tauzin, Congressman Dingell, Members of the Committee: Thank you for the opportunity to speak here today on the importance of adequate natural gas supplies to our nation's energy security and economic vitality. My name is Forrest Hoglund, and I am the CEO of Arctic Resources Company (ARC), a sole purpose company developed to facilitate permitting, construction and operation of a natural gas pipeline from Alaska's North Slope to gas-hungry markets in the lower-48 states.

Chief among this nation's opportunities to increase our domestic natural gas supplies and increase our energy security is facilitating construction of a natural gas pipeline from Alaska's North Slope to markets in the lower-48 states in the lowest cost, shortest, and most environmentally sensitive manner available. Without Congressional impediments currently included in the House and Senate energy bills, the

market will ensure that this line is constructed and operates to the benefit of all natural gas consumers, gas producers and explorers, the U.S. government, U.S. taxpayers, Alaskans, Native Peoples and the Canadian government.

Construction of an Arctic natural gas pipeline is the biggest impact energy project available and the most important to America today. The question to Congress is this: Should a pipeline be constructed in the lowest cost and most environmentally responsible manner that provides the most benefit for taxpayers and natural gas consumers, or should Congress mandate that a high cost, economically risky project be undertaken to appease some Alaskan political interests and economically benefit the largest oil companies in the world by shifting the project risk from the companies to the U.S. tax payers? I submit that if the Congress passes legislation in the form that is currently being considered, no pipeline will be built.

The construction of an Arctic gas pipeline has an interesting history. There was a big push by industry, the U.S. and the Canadian governments for construction of a line 28 years ago. Industry spent about $750 million and almost all the stakeholders decided that a Northern Route was preferable both economically and environmentally. One buried pipeline laid in a good pipeline construction path was much better than two pipelines, one of which had to run through approximately 900 miles of mountains. The same remains true today. Unfortunately in the 70's, due to Aboriginal opposition and Aboriginal land claims that were not settled at that time, a Canadian Commission called for a 10 year moratorium on a pipeline through the Mackenzie Valley, and that ended up blocking the Northern Route. With the Northern Route ruled out, President Jimmy Carter approved the Southern route in the Alaskan Natural Gas Transportation Act (ANGTA), but it was so uneconomic it was never built. Alaskan politicians and labor unions kept the ANGTA Route as their dream and kept working to find ways to get someone to subsidize its construction.

Today, Alaska, BP and ConocoPhillips think they have found the way. Both last year and apparently this year they have convinced Congress to mandate the uneconomic Southern Route. The U.S. Senate is also seriously considering some very flawed tax and other economic incentives in its energy bill that it knows are needed since the mandated route is uneconomic. The Bush Administration is firmly against the mandate and these incentives, and considers that approach bad energy policy as evidenced in their May 8, 2003, Statement of Administration Policy (attached).

COMPARING THE TWO OPTIONS

The Alaskan proposal requires two pipelines—the Alaskan Highway (or Southern) Route and another to connect Canadian reserves through the Mackenzie River Valley. Below are maps of the two separate pipeline routes that would be needed to transport both Alaskan North Slope and Canadian Mackenzie Valley natural gas to markets.

This Southern Route parallels the oil pipeline right of way to Fairbanks, and then proceeds down the Alaska Highway to pipeline interconnects near Edmonton, Alberta. Interestingly, two-thirds of the Southern Route line must be laid in Canada. The Mackenzie Valley only line originates in the Mackenzie River Delta and follows the Mackenzie River Valley south to Edmonton.

The following map shows the proposed Arctic Resources pipeline route. This proposal is very close to the preferred route proposed 28 years ago.

The Arctic Resources proposed pipeline proceeds offshore from Prudhoe Bay to the Mackenzie River Delta, connects the Canadian reserves, and then continues down the Mackenzie River Valley to Edmonton, Alberta. The offshore segment of the pipeline will be buried in a 15 foot trench and will be constructed during the winter months. This route is shorter, faster to construct, and has a lower cost. This project does not need subsidies or financial incentives. All one needs to do is look at the maps to decide which answer is best.

As shown in Chart 3, in comparing the competing pipeline proposals, one must realize that a Southern Route requires two pipelines whose combined total will be twice as long (3490 miles versus 1665 miles) and twice the cost ($14.6 Billion versus $7.8 Billion) of a single Northern Route. Proponents are working to have the Southern Route subsidized.

The Northern Route does not need to be subsidized. In fact, the Northern Route should create significant tax revenue for both the United States and Alaska. Pipeline tariffs on the Northern Route are in the range of 50 to 75 cents per thousand cubic feet (Mcf) lower than a Southern Route alternative, which means better economics for the natural gas explorers and therefore more natural gas will be found for American consumers. In any business where a product is a long way from the market, the lower-cost transportation system is always more desirable. When politics get in the way of sound economics, nothing good happens.

If the economic comparison is so compelling, why are the major producers not backing the Northern Route? Good question. They did 28 years ago, but now, two of the three North Slope majors—BP and ConocoPhillips—have fallen in lockstep with the Alaskans. They dispute the cost differences (not the distances) and their latest answer is that both routes cost nearly the same. It is interesting that this new position came after Congress showed a willingness to subsidize the Southern Route. Several parts of their estimate need to be expanded upon. First, they added roughly a $4 billion cost contingency for summertime offshore construction in the Beaufort Sea evidently due to more ice problems. This does not affect our estimate since we are talking about winter construction. They also say construction costs are around $20 billion to get the gas all the way to Chicago when there is no clear economic evidence to show that a pipeline needs to go beyond the existing pipeline interconnects near Edmonton, Alberta. These two producers evidently feel that if the U.S. taxpayers will guarantee the debt and subsidize a line to Chicago, why not try for it?

They also never mention the cost of the line in Canada. Keep in mind that they want a mandate so that the projects cannot be compared. ARC is not seeking a mandate; we are willing to stand on merit, markets, geometry and statutory regulatory requirements. Buying the mandate argument is like letting the wolf design how strong the hen house will be. The real question should be: *Why is Congress mandating a route rather than letting the regulatory process and market forces work as they were designed?* The Bush Administration has recognized this important question and has asked the Congress not to mandate a route and not to subsidize the pipeline with tax credits. Such Congressional action is unnecessary. It could be very expensive for the taxpayers. And, it will jeopardize the construction of any pipeline by aggravating our Canadian neighbors.

IMPORTANT INTERESTS NOT REPRESENTED

Several important parties and issues are being ignored in the current Congressional debate on construction of this natural gas pipeline. First of all, Canada is a very important player in this pipeline debate because the National Energy Board (NEB) of Canada must approve the pipeline plans for either route. About two-thirds of the Southern Route goes through Canada (if Edmonton is the terminus), and about 90% of the Northern Route is in Canada. Applications must be filed with the NEB and the Board must consider economic, regulatory and environmental aspects of the line. It will not be in Canada's interest to approve a subsidized line for Alaskan gas that will disadvantage Canadian gas in the marketplace.

The Canadian government has been vocal on this issue. The Canadian alternative is to build a Canadian-only line which is not very economic either. Two high-priced pipelines will definitely limit the exploration potential in Alaska and Canada due to higher pipeline tariffs and less profit on the lines, to the detriment of both countries. Additionally, there are significant Canadian Aboriginal land claim problems with the Alaskan route that are being glossed over. The likelihood that Canada will delay or block the Alaskan plan is high.

As previously mentioned, two high cost pipelines into Alaska and Canada will limit the exploration efforts in both the North Slope and Canada's Mackenzie Valley. A subsidized pipeline will be an economic discouragement to exploration and production interests in all other North American producing regions. A number of independent companies and industry associations have protested against the Congressional actions. One low cost pipeline system, selected through market competition in an open and transparent regulatory process, with open access features for new volumes, is what is needed to maximize the exploration potential in each area. **This is the most important energy project in North America; both countries and other interested parties need to be involved in the process.**

Two high cost pipelines, particularly one that goes all the way to Chicago from Prudhoe Bay, will be very expensive to U.S. and Canada taxpayers and natural gas consumers. The subsidies being considered for the Southern Route are designed to move only the current proved reserves on the North Slope of Alaska. The Northern Route does not need subsidies and, in fact, would create significant tax revenues for both Alaska and the United States government. In mandating an uneconomic route and forcing taxpayers to subsidize the construction and operation of the line, Congress seems to not be fairly representing the majority of its constituents.

Natural gas consumer interests are also not being adequately represented. The lowest cost system will create the largest gas supplies and the best economic results. If the U.S., Canada and Alaska will support the lowest-cost system, it will also be the fastest line to be built.

The project can also be a definite plus for U.S. and Canadian businesses if done right. The Southern Route (ANGTA) pipeline plan involves laying 52-inch high pressure pipeline through approximately 900 miles of mountains and the chances of significant cost overruns are present. There are no pipe mills in North America that can manufacture any significant quantity of 52-inch pipe; only German and Japanese mills can manufacture the steel for a pipeline of this magnitude and pressure.

Construction of this natural gas pipeline would be the largest steel order in North American history. It would be a shame to congressionally mandate a project in which North American pipe mills could not participate. The Arctic Resources plan for laying two 36" lines in succession would allow Canadian and U.S. pipe mills to help fill the orders. In addition, standard construction equipment could be used to lay the pipeline. There is currently no construction equipment to lay 52-inch pipe, so contractors would have to build new equipment for the project. Operating in mountainous terrain is another cost risk. Limited pipe suppliers and unfamiliar equipment are recipes for cost overruns. With regard to jobs, there is no great differential between the routes. Many qualified people will be needed, and either route will have to employ significant labor from Canada, Alaska, and the lower-48.

THE ROUTE MANDATE

There are several flaws in the route mandate and the subsidies being proposed in the House legislation (H.R. 6) and the Senate version (S. 14).

First of all, there is a better route than the Southern Route. A single Northern Route is preferable to two—an expensive Alaskan line, plus another line through the Mackenzie Valley for the Canadian reserves. As noted, in ARC's view, the two lines would be twice as long and cost twice as much as one Northern line. In addition, the footprint of the pipeline would be 3,400 miles instead of 1700.

A mandate for the more costly option does nobody any good over the long term and should be fought as hard as the tax and economic subsidy being proposed.

THE TAX CREDIT SUBSIDY

This Senate's proposed subsidy package also has several questionable features. The $.52 per million British thermal units (MMBtu) tax credit that the Senate Finance Committee has endorsed would kick in when wellhead prices dip below $1.35 per/Mcf. There are two objectionable features in that approach.

First, proponents claim that up to 20% of U.S. gas has Section 29 credits, so they should get these credits as well. What the Senate has proposed is not a Section 29 tax credit. Section 29 credits are normally given when it has been established that they are needed to develop the resource. The credits would not be given if there were less costly ways of developing the resource. Alaska and two major companies' logic is to first mandate that a high-cost route be built, then a subsidy would obviously be needed. A much better, free market approach would be to have no mandate and no subsidy. In the alterative, if Congress deems that subsidies are necessary, then they should apply to any route built and be available to any gas that moves through the pipeline.

Secondly, basing the tax credit on the North Slope wellhead price is a way of shifting the cost/risk responsibility from the North Slope gas producers (BP, ConocoPhillips and ExxonMobil) to the pipeline debt holders or guarantors. If the high-cost approach being taken by the majors ends up costing considerably more, the multi-national oil company producers would still be guaranteed at least $.52/Mcf after taxes (that is more like an $.80 wellhead price), no matter how high the pipeline tariff goes. The major producers have found a tricky way to shift the risk away from them. Congress should recall that the last time the majors built a big pipeline in Alaska, the Alaskan oil pipeline, the cost estimate of roughly $900 million ended up ballooning to $9 billion.

OTHER SUBSIDIES

In another questionable maneuver, the majors also want to include the gas conditioning plant in the pipeline tariff before getting to a wellhead price. The plant is needed to clean out CO_2 and nitrogen from the gas and, under normal industry practices, that cost would not be included in a pipeline tariff. For example, if other producers have clean gas, they would not need a gas conditioning plant and they would not want to pay for a portion of the majors' plant. By trying to include the plant in the tariff, the total pipeline tariff is higher and, therefore, the wellhead price lower, which means the tax credit is triggered faster.

They also want and the Senate legislation provides for federal debt guarantees of up to $18 billion for the pipeline. That level of guarantee is needed to get the pipeline all the way to Chicago so that the majors can control the gas going to market

there. Normally the line would stop near Edmonton where existing or expanded intersecting pipelines would move the gas to markets on the West Coast, Midwest, or wherever else they may be needed.

But, if the Alaskan parties can convince the government to guarantee the loan, the line can be constructed all the way to Chicago and the other pipelines will be bypassed. That would limit competition and further exacerbate the problems of industrial and other consumers as they struggle with high gas prices. A much better approach would be to only approve enough in loan guarantees (approximately $8 billion) to get the gas to Edmonton and to make it applicable to all routes. The Canadians may also wonder why the U.S. is guaranteeing all the debt for a pipeline that is two-thirds in Canada, particularly when the Canadians oppose this treatment.

It is difficult to get the right thing done for taxpayers and natural gas consumers when the major reserve holders have fallen into the Alaskan web. They have been convinced that the taxpayers will backstop any project financial risk due to the Alaskan political strength. It must be difficult when the major stakeholders spent a lot of money 28 years ago and decided the Northern Route was lower cost, shorter to construct and was better environmentally to now try to argue the other side. Intellectually, many Alaskans, consumers and taxpayers, natural gas producers and others who have studied the problem are confounded. The Southern route is 20th century solution of necessity. Now, 30 years later, the country needs a 21st century solution to bring Alaskan and other Arctic gas to market.

THE RIGHT ANSWER

The first thing that has to happen to ensure that the appropriate pipeline is constructed is to convince Alaska that U.S. taxpayers will not take all the risks on the project, and the most economic project and the best environmental project is the one that should ultimately be built. They also should understand that the Canadian government has a legitimate role in approving and permitting the pipeline, and should be involved in the planning phase.

Recently, Canadian Minister Robert Nault called for a Bilateral Commission to be formed to study this subject with the U.S. and Canada participating. I believe that this is an excellent approach to solving the problem. The U.S. also has a lot at stake since a good deal of the future exploration potential lies on federal lands; it is not all in Alaska.

ALASKA'S STAKE

It should be noted that Alaskan long term economic impacts will be much better with the most economic project being built. Prior studies in Alaska have shown that with the Northern Route they should make about $4 billion more from severance taxes and royalties due to the higher wellhead prices resulting from the lower transportation tariff. With the lowest-cost system, Alaska also will have more exploration activity and therefore more future gas reserves will be discovered, which equates to more long-term jobs in the State. Any short-term construction jobs gained from building the Alaskan line do not offset the high project cost to the taxpayer or lower long-term gains for Alaska.

When once again Congress refuses to provide tax subsidies for a Southern Alaskan line, Alaska's best option will be to work with the other states and Canada to get the right project built as quickly as possible. *When Alaska drops its opposition to the Northern Route, a project will then be able to move forward fast, and will end up being the best answer for all.*

WHAT SHOULD CONGRESS DO NOW?

The House has passed the route mandate in H.R. 6, and it appears the Senate is poised to pass the mandate as well as the tax subsidy and debt guarantee package in its energy bill, S. 14. This is exactly what happened in the last Congress.

During the energy conference, the House should remain steadfastly opposed to the tax subsidy and debt guarantee package, and, just like last session, realize that the mandate without the subsidy is harmful to all U.S. natural gas consumers. The Bush Administration is supporting the no mandate or subsidy position and instead is promoting good energy and financial policy allowing the market to work for the right decision.

As you join with your Senate colleagues in a conference committee on your respective energy bills, I would encourage conferees to oppose the massive subsidy package and route mandate for an Arctic natural gas pipeline. If the route mandate and subsidies are struck from a final compromise bill during the Conference Committee, then we can all start working on the right answer for everyone. Once that happens,

then Alaska and the major producers will be free to pursue the most economic route available in an expeditious manner and all of the country will benefit.

It should be noted that there are several provisions in the House and Senate legislation that would be beneficial to expediting construction of an appropriate natural gas pipeline to get these reserves to market. Passage of those provisions would lead to greater regulatory certainty in pipeline construction, and I would encourage you to retain these provisions in conference.

Thank you, Mr. Chairman, for the opportunity to present this testimony before you here today. I appreciate your willingness to listen to my concerns, and I hope you will take my recommendations under serious consideration when you go to conference with your Senate colleagues. I look forward to answering any questions you may have for me today.

Chairman TAUZIN. I have got someone I want you to meet. His name is Don Young.

Mr. HOGLUND. I have met him.

Chairman TAUZIN. The gentleman next is the TransCanada Pipeline Limited President and CEO, Mr. Harold Kvisle.

STATEMENT OF HAROLD N. KVISLE

Mr. KVISLE. Thank you, Mr. Chairman. Thank you to the committee for allowing me to address you today.

TransCanada, first of all, is one of the largest gas transmission companies in the world. We transport about 75 percent of western Canada's gas, and much of that goes to U.S. markets. We move significant volumes to markets in California, in the U.S. Midwest, and over to New York and New England as well. One of our subsidiaries is Foothills Pipe Lines, which holds the certificates to construct the Canadian portion of the Alaskan natural gas transportation system, the Alaska highway project.

Over the next decade, we do agree that demand for natural gas in the United States will grow significantly. We see demand growing by about 18 BCF, and we see North American conventional supply growing by only 5 BCF. That leaves a gap of more than 10 BCF that must come either as imported LNG or from frontier basins.

People have expected that much of this gas will come from western Canada, but today we see production growth flat-lining in western Canada, and there is very significant increase in demand in no small part due to the oil projects that exist at Fort McMurray and which will supply a very large portion of North America's future crude oil requirements.

On the supply side, we see production growing from various parts in the United States. We see one or two BCF a day coming from the Rockies, the Gulf Coast, and from western Canada. But that growth represents only 5 BCF a day of incremental gas, as compared to the 10 BCF a day that I mentioned earlier that we will need to balance supply and demand.

The most significant increase that is available to us today I would submit is from the frontier basins in Alaska and northern Canada. Let me speak specifically about the Alaska gas project.

In the late 1970's, Canada and the United States signed a treaty to govern the transportation of Alaska gas to market. Canada enacted the Northern Pipeline Act, which granted Foothills the certificates to construct the Canadian portion of the project.

Sorry about the slides.

We also in Canada established the Northern Pipeline Agency to oversee construction of the project. Over the past 25 years, Foothills and the Canadian government have maintained those certificates and maintained the route entitlements that would enable us to get that pipeline built quickly. In 1982, we built the Prebuild portion of that pipeline. This does in fact today deliver western Canadian gas to markets in California and the Chicago regions of the Midwest.

Under the existing treaty, we think Canada brings you a quick and expeditious alternative to get that pipeline built through the Canadian portion of the project. By using the Foothills structure, you can ensure utilization and optimization of existing infrastructure and reduce both capital costs and the risk of cost overruns for the project. In addition, we can provide market diversity for Alaska gas, moving it to markets both east and west of the Rockies, to California and to the Midwest. We think this is a significant advantage that should not be overlooked.

With respect to routing, we think that broad stakeholder interests are served by two pipes, one to move Mackenzie gas down through Canada and through our systems into our North American markets and the other to move Alaska gas; and this is what TransCanada as proposed for several years now.

TransCanada and Foothills have been essential to developing the transportation infrastructure for northern gas for almost 30 years. This is not a new project for us. This is something that we are prepared to proceed with and implement in the most expeditious way. We have never wavered in our belief that both Alaska and Mackenzie natural gas will be needed by the North American economy. We have patiently maintained both Alaska and Canadian transportation projects, and we do intend to play a central role in developing the most efficient way to move northern gas to market.

Thank you again for allowing me the opportunity to present my views this morning.

[The prepared statement of Harold N. Kvisle follows:]

PREPARED STATEMENT OF HAL KVISLE, PRESIDENT AND CEO, TRANSCANADA CORPORATION

INTRODUCTION

Good morning, Chairman Tauzin, Congressman Barton, Members of the Committee. My name is Hal Kvisle. I am the President and CEO of TransCanada Corporation (TransCanada). Last month, TransCanada announced the purchase of the remaining share of Foothills Pipe Lines Ltd. (Foothills) it did not already own. Once Canadian Government approvals required for the transaction are in hand, TransCanada will own 100% of Foothills. TransCanada and Foothills have a longstanding interest in the development of northern gas and welcome the opportunity to participate in this proceeding.

Foothills is the owner of the Canadian section of the Alaska Natural Gas Transportation System (ANGTS or Alaska Highway Pipeline) and joint owner with TransCanada of the Alaskan segment. Foothills holds the certificates awarded by the Government of Canada to construct the Canadian portion of the Alaska Highway natural gas pipeline project. The Prebuild portion of the ANGTS was constructed in the early 1980's to transport surplus Canadian gas to the United States. The Prebuild pipeline has been expanded several times over the past 20 years. It currently has assets of US$1 billion, a total capacity of 3.3 Bcf/d and it transports approximately 30% of total Canadian gas exports to the United States.

Foothills' eastern leg runs from central Alberta eastward to a point on the Canada/U.S. border where it interconnects with Northern Border Pipeline Company to serve gas markets in the Midwest. Foothills' western leg extends from central Al-

berta to a point on the Canada/U.S. border where it interconnects with Pacific Gas Transmission to serve gas markets in California and the Pacific Northwest.

TransCanada is a leading North American energy company. It owns one of the largest natural gas transmission systems in the world—over 24,000 miles and has operations and facilities extending across Canada and into the northern United States. TransCanada transports approximately 75% (5 tcf/year) of western Canada's natural gas production to markets across North America. TransCanada also manages or controls more than 4,100 MW of electric generation in Canada and the United States.

TransCanada is headquartered in Calgary, Alberta, Canada. Its shares trade on the Toronto and New York Stock Exchanges. TransCanada has 2,400 employees and total assets of US$14 billion. Our 2002 net income was approximately US$500 million.

ASSESSMENT OF OVERALL NORTH AMERICAN SUPPLY AND DEMAND

TransCanada expects the growth in natural gas demand in North America to outpace supply from traditional gas sources over the next decade necessitating new gas supply from frontier basins. We believe that natural gas from the Mackenzie Delta in Canada's north, Prudhoe Bay gas from Alaska and liquefied natural gas (LNG) are all required in the next decade if North America is to have acceptable gas prices.

Natural Gas Demand

TransCanada forecasts total demand in the U.S. and Canada to grow by 18 Bcf/d in the ten-year period from 2002 to 2012. The adjacent chart highlights Canadian growth of approximately 3.7 Bcf/d or almost 50% over this timeframe. This dramatic growth in Canadian gas demand will require new supply sources to permit western Canadian gas to continue to serve its traditional markets. The three U.S. regions that are served by Canadian gas exports will increase their gas demand by 7.6 Bcf/d or approximately 25% in this same timeframe. The remaining 7 Bcf/d of demand growth will occur in the southern United States.

The significant growth in Canadian gas demand is focused on western Canada and is primarily driven by substantial industrial demand growth in Alberta from oilsands and heavy oil development. This chart highlights the components of Alberta gas demand over the next decade.

The Alberta oilsands have recoverable reserves of 315 billion barrels. Oil production from the oilsands is expected to grow dramatically over the next decade. This increase in oil production will replace declining conventional oil production in Canada and provide a secure and growing source of oil for North American markets in the long term. The oilsands produced 0.8 million barrels per day in 2002. This production is expected to nearly triple to 2.3 million barrels per day by 2015.

Achieving this increased oil production, however, is an energy-intensive process. It will consume approximately 1.5 Bcf/d of additional natural gas to extract the oil from the oilsands, produce in-situ heavy oil reserves and provide the necessary electricity generation for that region. The adjacent map illustrates the current, or expected new oil sands or heavy oil sites in northeastern Alberta near Fort McMurray over the next decade. Many of these new projects are producing or under construction.

There are several critical uncertainties that would affect our forecast of North American natural gas demand. Long-term growth rates of the U.S. and Canadian economies, the level of oil prices, and the relative price of natural gas to other fuels could all have a significant impact on natural gas demand over the next decade. The current uncertainties in the power sector, the effect of environmental policies such as the Kyoto Protocol in Canada and the conventional natural gas supply response will also affect gas prices and demand.

Supply

Currently, there are some concerns that inadequate natural gas supply could cause sustained high gas prices and negatively impact the North American economy over the long term. TransCanada expects that gas supply from traditional U.S. and Canadian natural gas sources will grow by approximately 5 Bcf/d from 2002 through 2012, leaving a gap of more than 13 Bcf/day to be filled by new sources of supply. Without new gas resources, natural gas prices could be expected to rise high enough to restrict gas demand, thereby balancing the market. We forecast both sources of Arctic gas coming on-stream by 2012—Mackenzie Delta gas from northern Canada in late 2008 and Prudhoe Bay gas from Alaska in late 2011. Significant new LNG will also be required; beyond the capacities of the existing four LNG terminals.

The chart above indicates that the Rockies, the Gulf Coast and the Western Canadian Sedimentary Basin (WCSB) are the only traditional exploration basins ex-

pected to increase their gas supply over the next decade. The relative growth in the Rockies is significant, with much more modest growth rates in the Gulf Coast and western Canada. More than 5 Bcf/d from northern Canada and Alaska is required by 2012, as well as an additional 7 Bcf/d of LNG to balance the market and bring gas prices back to US$4.00 per MMbtu and keep them in that range.

Western Canadian gas production increased more than 50% in the 1990's, but has leveled off post-2000 despite a significant increase in wells drilled and connected. More than 10,000 wells are expected to be drilled per year going forward to allow western Canada to maintain and modestly increase its natural gas production. The increasing maturity of the basin and the annual depletion of approximately 3.5 Bcf/d necessitates high levels of drilling each year. This same situation exists in the Lower 48 gas basins.

The modest increase of 1.2 Bcf/d in western Canadian production from 2002 to 2012 is clearly insufficient to meet the expected growth in Canadian gas demand of some 3.7 Bcf/d over this period, let alone provide any additional supply to meet U.S. demand. Natural gas production from conventional sources in western Canada is at, or is approaching, its peak and is forecast to begin a significant decline within a decade.

Unconventional sources, primarily coal bed methane, are projected to begin to make a contribution to western Canadian gas supply over the next 10-15 years. Unconventional supply from western Canada should be approaching 2 Bcf/d by the time that Alaskan gas is in-service. Gas from Canada's North will be available this decade to partially meet the growth in demand in western Canada.

Natural gas production from Canada's East Coast near Sable Island has currently plateaued at approximately 0.5 Bcf/d. Our projections have this growing to nearly 1 Bcf/d by 2010. Significant uncertainties in the near term exist with regards to the specific timing of new production from Canada's East Coast.

Total natural gas supply from traditional sources in Canada and the United States will be insufficient to meet projected growth in gas demand, in our view. Natural gas from frontier basins in Alaska and Canada's north are required within a decade to supplement new LNG supplies to ensure North America has competitively priced natural gas.

ALASKA GAS PROJECT

In the late 1970's, Canada and the United States signed an Agreement on Principles (a "treaty") to govern relations between the two countries for the transportation of Alaskan gas to market. After a protracted competitive regulatory process, the Government of Canada passed into law the Northern Pipeline Act to effect the terms of this treaty. The Northern Pipeline Act awarded Foothills Pipe Lines Ltd. the certificate for the construction of the Canadian portion of the Alaska Natural Gas Transportation System along the Alaska Highway. The Canadian Government also established the Northern Pipeline Agency as a single window regulatory body to oversee the construction of the pipeline in Canada. Changes in the North American natural gas supply/demand balance postponed actual construction of the pipeline from Alaska.

Over the past 25 years, the governments of Canada and the United States have maintained the pipeline treaty. The Government of Canada and Foothills have maintained Foothills' certificate to construct the Canadian portion of the pipeline. The Northern Pipeline Agency continues as the regulatory body to oversee the construction in Canada. Foothills' certificates to transport Alaskan gas across Canada remain valid today. Foothills pipeline through Canada can connect to a pipeline in the State of Alaska constructed under the Alaska Natural Gas Transportation Act or other U.S. legislation.

In 1981/82, Foothills used its certificate to construct the Prebuild pipeline to transport available Canadian gas to U.S. markets in advance of the startup of Alaskan gas. Utilization of the Foothills system through Canada under the Northern Pipeline Act provides regulatory structure and certainty for Alaskan gas, as no new legislation or regulations are needed in Canada. It is the most expeditious and preferred means to advance the Alaska pipeline project within and across Canada.

The Foothills Prebuild system is integrated with the existing western Canadian pipeline grid. Construction of the Alaska project in Canada under the Northern Pipeline Act will ensure utilization and optimization of existing infrastructure, and provide market diversity for Alaskan gas east and west of the Rocky Mountains. The Canadian gas infrastructure currently has approximately 2 Bcf/d of spare capacity, and we forecast there will be significant spare pipeline capacity at the time Alaskan gas is delivered to market. The Alaska project is expected to initially transport 4.5 Bcf/d. Integration of the project into the existing infrastructure will reduce

the capital costs and cost overrun risks for a new project, reduce regulatory risks and minimize environmental and other societal impacts. All of these benefits are available for Alaskan gas by using the existing Canada/U.S. treaty, existing Canadian legislation (the Northern Pipeline Act) and integration via Foothills with the existing North American pipeline grid.

As is evident from our supply/demand testimony, Foothills and TransCanada believe that Alaskan gas is needed soon to meet North American gas demand. We believe that using the Foothills system under the Northern Pipeline Act in Canada will expedite the Alaska project, avoid a new round of negotiations between the U.S. and Canada and provide maximum benefits to both countries.

Routing

With respect to overall northern natural gas development, Foothills and TransCanada believe that broad stakeholder interests are best served by a two-pipeline solution to move Mackenzie Delta and Prudhoe Bay natural gas to market through two separate pipelines. TransCanada has been actively engaged to make a standalone Mackenzie Valley pipeline a reality. The Mackenzie Valley pipeline proponents are expected to file a preliminary information package with Canadian regulators soon, with a formal application to follow late this year.

Based on our own in-depth engineering study, TransCanada's and Foothills—assessment is that the Alaska Highway route continues to be the most economic, least risky and most timely route to transport Alaskan gas to market. An over-the-top route has serious, uncontrollable weather risks, technology and environmental issues, all without a cost advantage. The Prudhoe producers also concluded one year ago that the capital cost for an Alaska Highway route was approximately the same as an over-the-top route. With the over-the-top risk issues, the Canadian certification for the Alaska Highway route in hand, and the State of Alaska opposing an over-the-top route, TransCanada and Foothills do not consider over-the-top as a viable route option.

The Mackenzie Valley project is proceeding on its own at this time and is currently on target for an in-service date of late 2008. Gas from Prudhoe Bay could be delivered to U.S. markets via the Alaska Highway pipeline by late 2011. The market has chosen the two-pipeline strategy.

CONCLUSIONS

Conventional sources of natural gas are not expected to be sufficient to meet expected growth in natural gas demand in North America over the next decade. Either new gas sources must be connected, or alternative fuels at competitive prices must be proven quickly, or gas prices will rise to mute demand growth. TransCanada and Foothills believe that the frontier gas sources already discovered in northern Canada and Alaska can be connected on competitive terms in this timeframe to meet market demands. Construction of two pipelines from Alaska and northern Canada will spur additional exploration for natural gas in those regions. This will provide additional supply for North American consumers, beyond the already substantial proven Arctic gas reserves.

Mackenzie Delta gas is expected to be in-service in approximately five years. This gas will primarily serve growing demand in western Canada and will therefore permit conventional western Canadian gas to serve its traditional markets in Canada and the U.S. Alaskan gas can be in-service by 2011 by moving along the Alaska Highway and across Canada under the existing Canada/U.S. treaty and the Northern Pipeline Act using the Foothills system. Significant benefits are available by integration with the existing North American pipeline grid in Alberta.

TransCanada and Foothills have been engaged in developing the transportation infrastructure for northern gas for almost thirty years. We have never wavered in our belief that both Alaskan and Mackenzie natural gas will be needed by the North American economy. TransCanada and Foothills have patiently maintained, since the 1970's, both the Alaskan and Canadian transportation projects and clearly intend to continue to play a central role in developing the most efficient transportation system for northern gas.

Thank you for this opportunity to present our views on the North American supply and demand picture and, particularly, northern gas from the Canadian Arctic and Alaska.

Chairman TAUZIN. Thank you very much, Mr. Kvisle.

Now, finally, Dr. Jeffery Currie, Managing Director of Goldman, Sachs of New York, New York, to give us the financial perspective on this looming crisis.

Mr. Currie.

STATEMENT OF JEFFREY R. CURRIE

Mr. CURRIE. Thank you, Mr. Chairman and members of the committee, for this opportunity to testify before you today about the short-term and long-term issues surrounding the U.S. natural gas market. I am a Managing Director at Goldman, Sachs where I am the senior energy economist, but I want to emphasize that the views presented here today are my own and do not represent the views of Goldman, Sachs.

The core problem with the U.S. natural gas market is inadequate infrastructure. This makes the current shortage very different from a normal cyclical shortage and will require much more dramatic action than simply allowing the markets to function.

Although the public attention has been focused on the ability to grow natural supply in the current environment, however, the underlying shortages in storage and transportation are the primary constraints on both supply and demand growth. The infrastructure in natural gas is so depleted that much of the adjustment has been and will continue to be in demand. The reason for this is that demand is the quicker and lower cost margin of adjustment, not supply.

Another way to view this is that destroying demand is much faster and cheaper than building expensive pipelines with long lead times. As a result, price spikes typically lead to demand destruction, not new supply. The demand destruction, in turn, creates dramatic price declines and, hence, the price volatility that we currently see today.

However, the much-needed investment in new infrastructure is ultimately discouraged by the increasing risky price environment in the core returns on these assets. Demand destruction is not a long-term solution to the problem. Shortages will develop again once demand recovers and create subsequent pricing spikes.

What we have on our hands right here is a vicious cycle that continues to repeat itself. But not only do these infrastructure constraints restrict demand growth, they also restrict the ability to grow supply. What this suggests is that solving the basic supply problem will not in itself solve the deliverability problems currently facing the natural gas market.

The basic supply question of whether to open up areas of drilling or depend upon LNG is a very important long-term issue, and I do not want to dismiss it. However, in the current environment, even if there was significant surplus gas, and there is surplus gas in the Rocky Mountains, the market doesn't possess the pipeline capacity to transport it. And even if it had the pipeline capacity to transport it, the market lacks the storage capacity to store it.

To demonstrate the critical importance these infrastructure constraints play, let's review the winter and summer of 2001. That winter severe shortages developed from a combination of cold weather and a lack of supply. Once inventories were exhausted, physical shortages turned critical. This resulted in a massive price spike to $10 that destroyed price-sensitive industrial demand to make room for heating demand. The loss to industrial demand was

massive, a 20 percent permanent decline that resulted in the loss of at least 200,000 manufacturing jobs.

The price spike also triggered a modest supply response which then, combined with the sharp drop in industrial demand, created a very large surplus in gas that took only 6 months to completely overwhelm the entire U.S. natural gas infrastructure.

By the end of summer of 2001 surplus gas had nowhere to go. Gas prices collapsed to under $2, and ultimately production had to be shut in.

So the broader question really becomes, why is the infrastructure so inadequate? The answer in its simplest form is that investing in energy infrastructure is distinctly unprofitable. A combination of regulation, taxes, and direct market intervention has made the return on capital in the energy industry a break-even proposition at best.

In 2001, a period of record high gas prices and record high equity evaluations, the entire gas industry—supply, transmission, and distribution—was actually valued at only 73 percent of the total cash invested. It is no wonder the capital markets have responded by not providing the capital to expand, and the net result is the capacity constraints that you see today.

The paradox of all this is that the underinvestment in infrastructure by the market is the correct economic outcome, given these poor rates of return. The best use of capital is in other industries where rates of return are higher. As the market solution is not concerned with volatility but rather with the expected rate of return, the market fails to generate the excess capacity or reserve capacity that is required to lower the price volatility. What this suggests is that transportation and storage assets should be viewed as public goods and treated just like a freeway or toll road.

The key policy aim in this context should be to create excess capacity that the market fails to generate. Such a policy would dramatically reduce price volatility, investment risk and create a more conducive environment for demand and growth.

That concludes my remarks, and thank you very much for your time to present my views.

[The prepared statement of Jeffrey R. Currie follows:]

PREPARED STATEMENT OF JEFFREY R. CURRIE, MANAGING DIRECTOR, GOLDMAN, SACHS & CO.

Mr. Chairman and Members of the Committee, thank you for the opportunity to testify before you today about the short-term and long-term issues surrounding the natural gas market.

My name is Jeffrey Currie. I am a Managing Director of Goldman Sachs, where I am the Senior Energy Economist. The views presented here today are my own and do not necessarily reflect the views of Goldman, Sachs & Co.

The current shortage in the natural gas market is quite different from a normal cyclical shortage, and more dramatic action than simply allowing the market to function will be necessary to address the core problem, which is significant underinvestment in basic infrastructure. Public attention has been focused on the ability to grow natural gas supply. However, in this case, the underlying shortages in storage and transportation are the primary constraint on both supply and demand growth.

The infrastructure in natural gas is so depleted that much of the adjustment has been and will continue to be in demand. Since demand is the quicker and lower-cost margin of adjustment, rather than supply, price spikes are likely to lead to demand destruction, which will quickly result in dramatic price declines. The much-needed investment in new infrastructure, however, has been and continues to be

discouraged by poor returns that are exacerbated by an increasingly risky price environment. Since demand adjustments are not a long-term solution to the problem, shortages will develop again once demand recovers, creating a subsequent spike in prices.

Further, these shortages in basic underlying infrastructure have prevented efficient use of existing supplies and efficient development of new supplies, which suggests that solving the basic supply problem will not, by itself, resolve the deliverability problems currently facing the natural gas market. The basic supply question of whether to open up areas to drilling or depend on LNG imports is a very important long-term issue. However, due to the current infrastructure constraints, even if there were significant surplus domestic natural gas (and there is in the Rockies), the market doesn't possess the pipeline capacity to transport it; and even if there were adequate pipeline capacity to transport this gas, which there is not, the market lacks the capacity to store it. Similar operational constraints also apply to potential LNG imports.

As a case study, the winter and summer of 2001 demonstrate the economic impact of constraints on storage and pipeline capacity. That winter, severe shortages developed from a combination of cold weather and a lack of supply. Once inventories were exhausted, physical shortages turned critical, resulting in a massive price spike to $10.00/mmBtu that destroyed price-sensitive industrial demand to make room for essential heating demand. The loss in industrial demand was massive: a 20% permanent decline that resulted in the loss of at least 200 thousand manufacturing jobs (see Exhibit 1). Yet, the price spike also triggered a modest supply response, which when combined with the sharp drop in industrial demand, created a very large surplus of gas that took only six months to completely overwhelm the entire US natural gas infrastructure. By the end of the summer of 2001, surplus gas had nowhere to go, gas prices collapsed to under $2.00/mmBtu, and ultimately production had to be shut in (see Exhibit 2).

The reason for this rapid reversal is straightforward economics—the industry did not possess the infrastructure to store or transport the surplus gas for a future supply shortage. When another shortage occurred only a year later in the winter of 2002/2003, the market had insufficient inventories to handle it. Looking forward from today, even if the industry filled storage to capacity by the end of this October, the inventory would still only cover 75% of all potential winter outcomes, leaving the market with a 25% chance of running into severe shortages before the end of next winter even under an improved supply outlook.

LACK OF STORAGE CAPACITY IS THE KEY DETERMINANT OF NATURAL GAS PRICE VOLATILITY

These experiences of the last couple of years show that storage capacity is the key determinant of natural gas price volatility. Storage capacity provides the system with a buffer to supply and demand shocks by allowing it to run surpluses and deficits that smooth the normal cyclical swings in prices. As storage capacity has failed to keep pace with growth in demand over the past two decades, this buffer has shrunk relative to the size of the market, resulting in chronically higher-than-normal price volatility.

In the 1980s, we had about 1,400 bcf of storage beyond that which is necessary to operate the system and deal with winter demand swings. This storage represented about 26 days of forward consumption, a significant shock absorber that generated relatively stable natural gas prices. Today, we have only 330 bcf of storage beyond what is necessary to run the system, which at today's higher demand levels is only 6 days of forward consumption. In response, price volatility has exploded to nearly three times the historical average (see Exhibit 3). Thus, fairly small deficits or surpluses will cause the market to move from full to empty and from $2 to $10/mmBtu or back in a relatively short amount of time.

POOR RATES OF RETURNS HAVE RESULTED IN UNDERINVESTMENT IN INFRASTRUCTURE

The broader question is, "Why has storage capacity and related infrastructure failed to keep pace with demand?" The answer in its simplest form is that a combination of regulation, taxes, and direct market intervention have made the return on capital in the energy industry a breakeven proposition at best and have made investing in the downstream (transportation, storage and other aspects of the infrastructure) distinctly unprofitable. The market has responded by not providing the capital to expand, and the net result is the capacity constraints that you see today.

If you look at the industry as a whole during 2001, a year which posted the highest annual gas prices on record, and saw historically high energy equity valuations during the 1H2001, the industry was not even valued at the cash that had been

invested into it, hardly a compelling return. Worse, if we exclude the super majors, the rest of the gas supply, transmission, and distribution industry was actually valued at only 73% of the cash invested (see Exhibit 4). It is hardly surprising that the market has not supplied sufficient additional capital to meet current demands.

If we look deeper into the numbers, the lack of investment in basic core infrastructure (storage and transportation) becomes even clearer. E&P, the drilling part of the business, has earned a 5.6% return on assets on average over the last three years, while distribution and transmission, the infrastructure part of the industry, has earned only a 2.4% return on assets (see Exhibit 5). This return on assets for downstream companies is considerably below the 5.0% return on assets earned by the broader S&P 500 index in the second half of the 1990s.

The reality of modern capital markets is that only industries with significant positive returns on cash invested above the cost of capital attract new capital. If you compare return on cash invested across industries over the last decade for companies in the S&P 500, the reason for today's energy shortages become quite transparent. Utilities and energy companies managed to produce slightly less than a 9% return on cash invested while the rest of the market produced returns on cash invested of 12.5% and above (see Exhibit 6). It is hardly surprising that most of the investment activity has occurred elsewhere, stressing our energy infrastructure to its limits.

CONTROLLED "DEREGULATION" INCREASES RISKS ON POOR RETURNS

Worse, the risks associated with these poor returns have increased significantly since the mid-1990s due to "deregulation" and "environmental rules." Clearly, the introduction of competition over the last decade has increased the risks associated with investments in energy infrastructure. In natural gas storage and transmission, controlled deregulation as opposed to true competition has dramatically increased risks (primarily volume risks). However, the rates of return on these assets have not risen over the last decade to compensate for the higher risks. Rather, the rates of return have fallen, which makes the situation worse on a risk-adjusted basis. Further, following "deregulation," the rates of return were supported primarily through cost reduction, as the emphasis in the industry shifted from reliability to efficiency, i.e. through getting rid of the excess. This is all too apparent in the drop in transmission and gathering pipeline capacity that was deemed "excess" during the 1990s (see Exhibit 7).

To internalize these risks, the industry in the past has relied upon long-term forward contracts or some form of vertical integration. Current regulations, however, discourage both of these forms of risk management, as the emphasis is placed on the use of spot prices and the transparency they provide to both consumers and producers. This spot price transparency is very effective in providing market signals for efficient drilling and consumption patterns, which are relatively low-capital intensive activities. However, for more capital intensive and longer lead-time activities, such as building infrastructure, a spot market price signal is a lagging indicator of an investment that should have already been made. Instead, forward contracts of sufficiently long duration are needed to internalize the risks and induce the needed investment in advance of shortages. Further, current regulations require any long-term contracts to build infrastructure to have such a high subscription rate, near 80%, that excess capacity will rarely be built, which reinforces the underinvestment problem.

POLICY NEEDS TO CREATE RESERVE CAPACITY THAT MARKET FORCES ARE FAILING TO GENERATE

The paradox of the current situation is that the underinvestment in infrastructure by the market is the correct economic outcome given the poor rates of return, as the best use of capital is in other industries where the rates of return are higher. The market solution is not concerned with volatility, but rather the expected rate of return. This solution only leads to new infrastructure when it is absolutely needed, which is usually too late. Just look at the only large infrastructure projects of the last several years—the Alliance, Kern River, and Gulf Stream pipelines—projects brought about by extreme pricing.

However, reserve or excess capacity should be viewed as a public good, just like a road, where markets fail to find a solution. This inability of the market to provide adequate incentives for investment in reserve infrastructure is where the market fails and why more dramatic action is required. Further, the current market and regulatory structure reinforces this price volatility as it emphasizes efficiency over reliability. Accordingly, the aim of policy should be to reduce the price volatility

through creating excess capacity without significantly sacrificing the efficiency and transparency of a market-based system.

Forcing excess capacity through regulation has not been met with much success in the past. Before the 1980s, regulatory practices emphasized reliability by requiring pipeline companies to demonstrate sufficient capacity to serve additional customers before projects would be approved. To internalize the risks of such ambitious projects, 30-year long-term contracts with regulated price caps were often used. These price caps were fixed and ultimately led to significant market distortions, as the market could not clear properly. The stranded costs generated during this regulatory period have been estimated at $80 billion in 2002 dollars.

Interestingly, the costs to consumers due to increased volatility in the post-"deregulation" period are not much smaller. Since 1995, these costs, measured as the cumulative difference between the price paid and marginal cost of production is near $75 billion in 2002 dollars, nearly the same as stranded costs generated from the regulatory period, and this does not include the costs of the California crisis and the long-term loss of manufacturing activity. Further, with the cost of an arctic pipeline estimated at $10 billion, these costs would have paid for new infrastructure and then some.

What this suggests is that transportation and storage assets may be thought of as public goods and could be treated just like a freeway or toll road. The US energy consumer would have most likely been made better off had the government taxed natural gas prices and used the proceeds to build infrastructure, just as it taxes gasoline to build roads. The key issue is to create excess capacity that market forces are failing to generate. This would dramatically reduce price volatility, investment risk, and create a more conducive environment for demand growth.

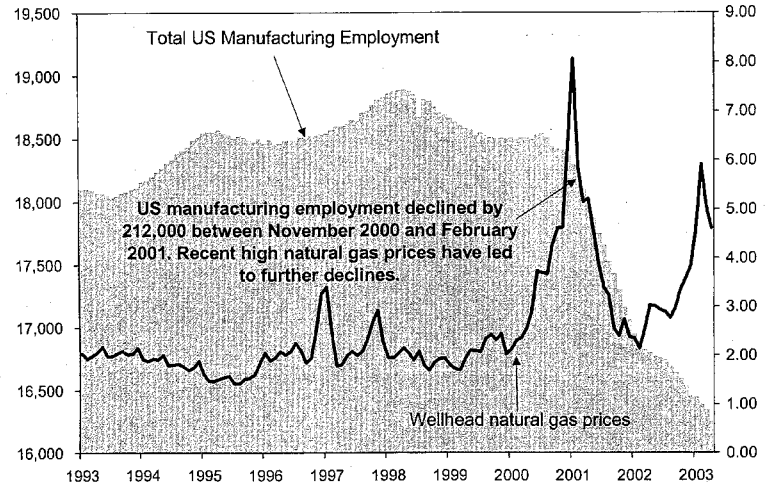
THE LACK OF INFRASTRUCTURE IS A LIMITING FACTOR ON ECONOMIC GROWTH.

Energy is rapidly becoming a major limiting factor on economic growth. If the core energy infrastructure in the United States does not improve, energy crises are likely to become progressively more frequent, more severe, and more disruptive of economic activity. Without significant new investment, each crisis further damages the system by permanently destroying the price-sensitive demand that serves as a pressure valve and by giving companies incentives to stress existing facilities to meet excess demand, leading to accidents and capacity losses.

The long-term consequences of either allowing infrastructure to remain inadequate or sacrificing environmental concerns in the name of economic expediency are unacceptable. Finding a "workable" solution will require imagination and flexibility from both a market and policy perspective. Economic solutions depend on diversification of risk and flexibility of response, both of which are lacking under the current market and regulatory structure.

Exhibit 1: Demand destruction has been concentrated in the manufacturing sector.

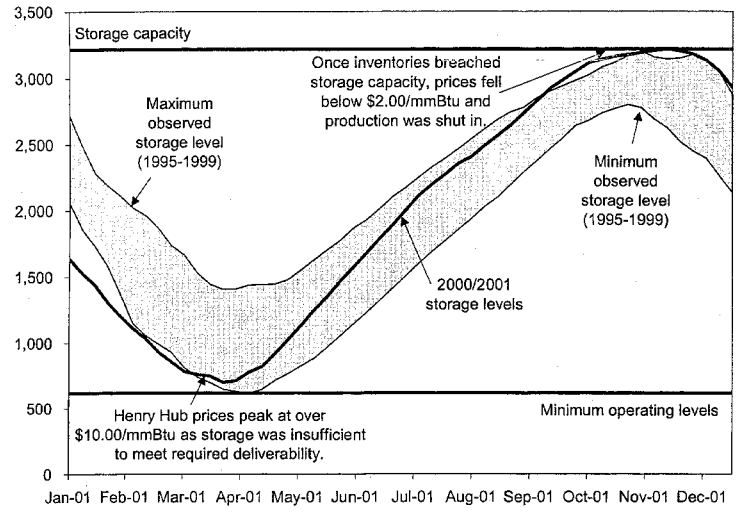
1,000 of manufacturing jobs (left axis); $/mmBtu (right axis)



Source: Bureau of Labor Statistics and US Department of Energy (DOE).

Exhibit 2: Lack of storage capacity constrains the market's ability to adjust.

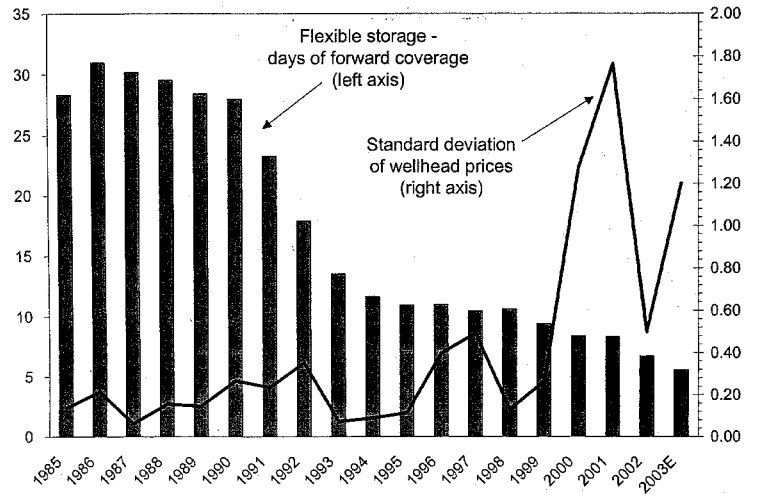
Bcf



Source: DOE and Goldman Sachs Research.

Exhibit 3: As reserve capacity has fallen relative to the size of the market, price volatility has increased.

Days of forward coverage (left axis); $/mmBtu (right axis)



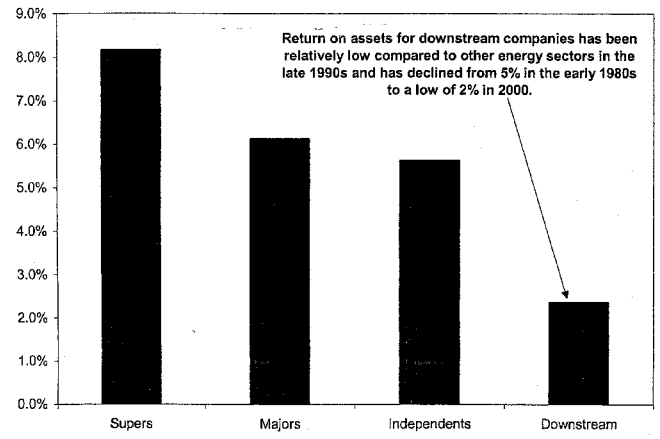
Source: American Gas Association (AGA), DOE, and Goldman Sachs Research.

Exhibit 4: The natural gas industry is valued at less then the cash that was originally invested

2001	Enterprise Value	Gross Cash Invested	EV/GCI
Super Majors	$678,984	$553,363	1.23
Majors	$166,026	$232,619	0.71
Independents	$80,765	$108,736	0.74
Downstream	$271,427	$368,169	0.74
Industry	$1,197,202	$1,262,887	0.95
Industry Excluding Super Majors	**$518,218**	**$709,524**	**0.73**

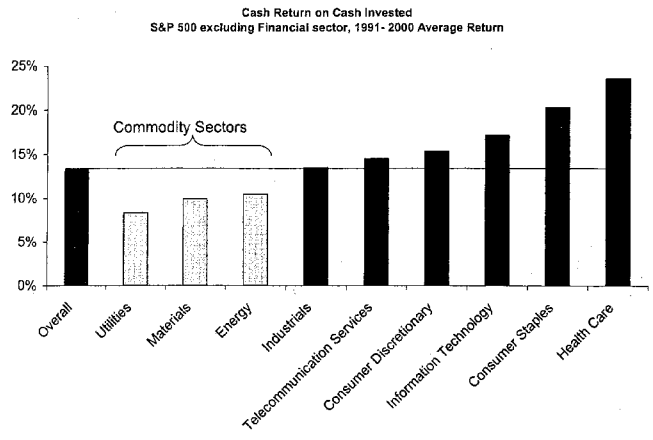
Source: Goldman Sachs Research calculations using Compustat data.

Exhibit 5: Poor downstream returns have generated the current infrastructure constraints.



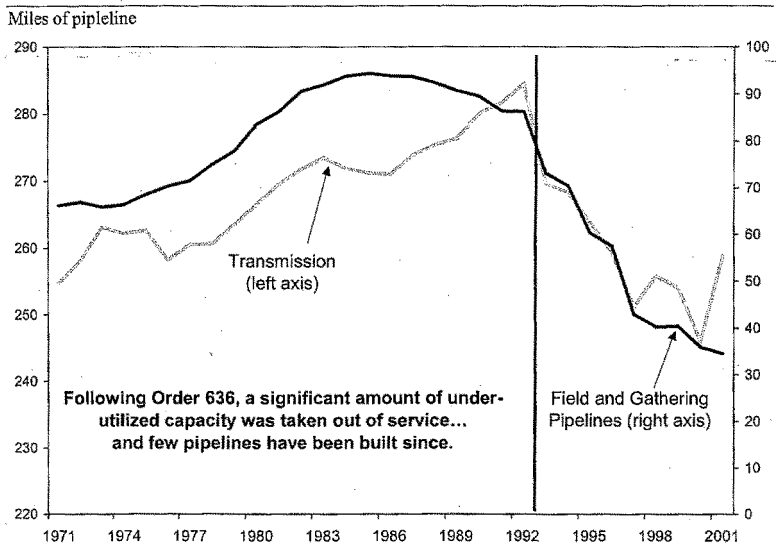
Source: Goldman Sachs Research calculations using Compustat data.

Exhibit 6: Energy sector returns have underperformed relative to most other sectors



Source: Goldman Sachs Research calculations using Compustat data.

Exhibit 7: Excess capacity has declined following deregulation as the emphasis shifted to efficiency



Source: AGA.

Chairman TAUZIN. Thank you very much.

The Chair recognizes himself for 5 minutes for the purpose of questions.

I have in my hand a story by the Reuters news service today in which it details how the Energy Secretary Spence Abraham is literally scheduling an emergency meeting on June 26th to consider ways to conserve in this critical area. So the Department of Energy is obviously very concerned, Mr. Caruso, when your boss is scheduling this kind of a deal.

Then, Mr. Mason, I look at your testimony, and I want to quote from it. It is a pretty strong message. You say, therefore, my message to home owners and renters is the conservation of energy can only have a marginal impact on their natural gas bills. In effect, the residential consumers have already, at least in your State, done the bulk of the conservation methods they can achieve. Is that correct?

Mr. MASON. Thank you, Chairman, Members of Congress.

It is my belief, based on the fact there was a serious 5 percent drop over the last 2 years when, on a normal cycle basis, there would be a half percent efficiency gained. So I think people took serious steps already. That doesn't mean other things can't be scrutinized.

Chairman TAUZIN. But you are basically saying the bulk of it has already been done. We are about to have an emergency conference on what else we can do to conserve. You are telling us, at least from Ohio, we have done most of that already.

Mr. MASON. Congressman, I am stating from the residential standpoint, which is only about 25, 26 percent of the total gas load.

Chairman TAUZIN. So then we turn back to Mr. Caruso, and we note that you give us a hopeful message that you think we can ride this out. But, in the extreme, if we have abnormally low temperatures and the economy does begin to pick up and demand increases, we could have some problems, couldn't we?

Mr. CARUSO. Definitely. Mr. Chairman, that is the reason I mentioned that markets are not only tight but the potential for volatility remains high with weather or other unusual circumstances.

Chairman TAUZIN. Unforeseen circumstances. You also say in your statement, in the current environment companies will need to obtain large amounts of natural gas from other sources to refill storage for the next heating season. What do you mean "from other sources?"

Mr. CARUSO. Well, on the supply side, although we have heard from our Canadian colleague that that may be difficult, we certainly need to increase our imports from both Canada and, to the extent possible, limited ability for LNG. But the other side of that is the destruction of the demand which has been mentioned by several witnesses.

Chairman TAUZIN. That is the other side. But if we are limited to other sources, we also face very limited options there, don't we? We face limited options in liquid natural gas imports to this country; we face limited options in terms of Canadian imports. Is that right, Mr. Kvisle? Right now, until we have new infrastructure, Mr. Currie, to permit delivery, we could be in some pretty tight spots, couldn't we?

Mr. CARUSO. Yes, sir.

Chairman TAUZIN. It is not just the homeowner and the consumer. Now we are looking at serious concerns for the farm community.

I want to quote from your testimony, Mr. Liuzzi: High natural gas prices present the most serious threat to the fertilizer sector and to farmers in general since the energy shocks of the 1970's. That is a pretty strong statement. I remember those energy shocks in the 1970's. In fact, I was elected to Congress in 1980 to come and hopefully straighten out the Federal policy that resulted from that.

What resulted from that was the Federal Government trying to control the price of natural gas through government fiat. We ended up with the worst disruptions of the natural gas markets this country has ever seen.

My concern is, are we building another problem like that? Are we going to face a situation where, because everyone wants natural gas to make electricity, it is the most environmentally popular source of fuel for electricity, homeowners will start seeing their fuel bills go up, shortages could develop depending upon weather conditions that we can't predict, and all of a sudden, you know, we can't get it fast enough? We can't blame Canada this time like the kids from South Park did. Canada is trying to get gas to us to the extent they can.

So we are left with a situation where even our fertilizer manufacturers are telling us we might not have the natural gas critical to the raw material production of essential fertilizers to the farm community and imports can't satisfy some of that demand because of

critical infrastructure problems again in ports and distribution systems. Are we building another case where we are going to be debating Federal price controls again?

Can anyone give us a better answer, any one of you out there? Mr. Kvisle.

Mr. KVISLE. I would offer a couple of comments.

First of all, in the near term there is virtually nothing that can be done to significantly increase the supply of natural gas. This is a multi-year process. And the big projects, whether it is LNG importation or natural gas from the north, will——

Chairman TAUZIN. Or gasification of coal, which my friend from——

Mr. KVISLE. These are all 5, 10 years. So the near-term market balancing mechanism, as Dr. Currie said, will in fact demand destruction.

I have great sympathy for people in industries like fertilizer, but it is the reality of what will balance the market in the near term. There is not just an infrastructure problem from Canada. We have supplied 50 percent of your incremental gas in the past 10 years, and our industry is now running flat out. There is not much more production increase available.

Chairman TAUZIN. So, to summarize it, short term we got very limited options. All we can do is press conservation as tough as we can in many circles. Long term, we need some policy to get supply back and infrastructure developed to make sure people can use it. We need to, long term, think about an alternative sources for natural gas in the marketplace; and so I yield to my friend from coal country for a discussion of that subject.

Mr. BOUCHER. Thank you, Mr. Chairman.

Mr. Caruso, I have several questions of you concerning the very enlightening testimony you have presented this morning. Among other things, you are projecting an increase in natural gas consumption by electricity generators from 5.3 trillion cubic feet in 2001 to 10.4 trillion cubic feet by 2025. In preparing that projection, what is your assumption about the number of new electricity generating plants that will be constructed between now and 2025 and how many of those new plants do you anticipate will be fueled with natural gas?

Mr. CARUSO. Our Outlook calls for almost 450 gigawatts of new capacity to be built between now and 2025. Of that, 80 percent is assumed to be natural gas-fired; and the largest of the remainder would be coal. Then there is a relatively small amount that would be wind-generation and other sources of renewable energy. That is on the assumption, of course, that, as I mentioned in the testimony, that prices for natural gas do retreat from these high levels we are seeing this year; and we see them continuing probably for 2 or 3 years. But the increased availability of gas from our unconventional sources does bring that price back into the $3 to $4 per million BTU range, a critical assumption in reaching conclusion that 80 percent of our new electric power plants will be fueled by natural gas.

Mr. BOUCHER. Okay. You are also predicting that coal prices during the course of that period will decline. But you are saying that,

even with falling coal prices, natural gas is going to continue to enjoy an advantage.

I wonder if you have taken a look at the provisions in the Senate version of the energy bill that extends a range of tax credits, production tax credits and investment tax credits, to electric utilities that use a new generation of clean coal technology? The information we have had from the utilities is that the level of tax credit afforded by the Senate bill would encourage a large number of them to use coal instead of natural gas in their new generating units. I wonder if you have taken any independent look at that and, if you have, if you could share it with us.

Mr. CARUSO. We haven't actually looked at that particular provision, but we certainly would be willing to do that, sir, if you would so desire.

Mr. BOUCHER. If we ask for it. Thank you.

Let me ask you also about the statement that you made on page 17 where you predict that increased U.S. gas production through 2025 will come from unconventional sources and also from Alaska. Two basic questions about that.

First of all, what kind of assumptions are you making about Alaska gas? We have had a lot of testimony concerning it here this morning. Are you assuming that a new pipeline will be built? And do you think that that—that this assumption that you have made is based upon any level of government support such as a loan guaranty or price floor with respect to natural gas production?

Mr. CARUSO. Yes, Congressman Boucher. The assumptions about the Alaskan natural gas in our long-term Outlook are that a pipeline will be built and, based on the outlook for prices that I mentioned earlier, that approximately $3.50 per million BTU price in today's dollars would be sufficient to attract that project. The other assumption we make is that existing policies are the basis of that judgment. There are no new subsidies that would be included. It would come on line, based on our latest Outlook, around the year 2020 using the route that was mandated by law, the fact that being the State of Alaska has prohibited the so-called northern route.

Chairman TAUZIN. If I can, that was done by statute, was it not?

Mr. CARUSO. Yes.

Mr. BOUCHER. Let me ask you also about liquefied natural gas imports. To what extent do you see any growth in those as you make these projections about gas usage?

Mr. CARUSO. We have LNG imports increasing to about 2 trillion cubic feet by 2025.

Mr. BOUCHER. What is the level today?

Mr. CARUSO. It is quite low today, around 200 billion.

Mr. BOUCHER. So you are projecting a major increase in LNG increase. Do you think that wise? Do you think that is good policy?

Mr. CARUSO. Well, I am not in the policy business. But to the extent that more options are available to meet growing needs, that makes the market more robust and less regional.

Mr. BOUCHER. One final question and that is, do you see a role for coal gasification as a possible way of bringing a new and unconventional means of gas production to the United States?

Mr. CARUSO. Our long-term Outlook has very little of that in it at this time.

Mr. BOUCHER. Thank you very much, Mr. Caruso.

Chairman TAUZIN. Thank you, Mr. Boucher.

The gentleman, Mr. Whitfield, is recognized I believe for 8 minutes for questions.

Mr. WHITFIELD. Thank you, Mr. Chairman; and I want to thank the panel for being with us this morning and for their testimony on this important issue.

Mr. Caruso, in your testimony you talked about in 2025 the demand would be 35 trillion cubic feet per year; and the supply would be in the neighborhood of 26 or so. Now, on the supply, are you including liquefied natural gas in supply on that supply side? In the 26 trillion cubic feet, is that including liquefied natural gas?

Mr. CARUSO. No, that would be part of net imports needed to fill that difference between the 35 trillion cubic feet and the 26.9 of domestic production.

Mr. WHITFIELD. All right. Now, Mr. Liuzzi in his testimony referred to artificially induced demand for natural gas; and I am assuming you are talking about the Clean Air Act and other regulatory matters, is that correct, Mr. Liuzzi?

Mr. LIUZZI. Yes, sir.

Mr. WHITFIELD. Do you all agree with him that there has been an artificially induced demand for the supply of gas through the policy of the government? Would anybody else like to address that issue?

Mr. KVISLE. TransCanada is also a power generation company, including here in the United States. We have used natural gas as a fuel for power generation, but those decisions were taken in an era where natural gas was quite inexpensive, in the $2 range. It is a different ball game when natural gas is north of $5. I don't know that it is so much a policy inducement as just gas was very cheap and a lot of major investments were committed. Whether people would commit to that in an era of higher gas price I am not certain.

Mr. WHITFIELD. Mr. English, would you agree with that comment. That there is an artificially induced demand for natural gas?

Mr. ENGLISH. I am not sure I would term it "artificial." There certainly is need based upon current regulations to have an environmentally friendly source of fuel for electric generation. But I think what we have to continue to keep in mind is that we do need a balanced portfolio of fuels for electric generation, and we do have an awful lot of coal in this country, we have nuclear option that has not been fully explored recently for a variety of reasons, lots of options out there, that we need have some balance rather than to think that we can depend upon just one source of fuel.

Mr. WHITFIELD. Well, I certainly agree with that. Like Mr. Boucher, being from a coal area, we have such a tremendous resource in coal. I, for one, think we need to address and look in a new way at this environmental standard that we have in America today.

My friend, Mr. Shimkus, here has a book with him today which I have called The Skeptical Environmentalist, written by a Professor Lomborg in Europe, who was Mr. Green in Europe. The New York Times wrote a large article about his book and another book, One Moment on the Earth, written by an environmental writer for

the New York Times. In both of those books they question the models being used in projecting global warming.

When you talk about this issue of global warming and acid rain, people just automatically accept arguments that are being made by a lot of environmentalists; and I think that this book and others are now bringing to the forefront that this is an area that needs objectivity in analyzing some of the models being used, particularly when you think of the impact that all of this has on our economy.

I would also like to ask a question about jobs and manufacturing. Do any of you feel like that we have lost a lot of manufacturing jobs in the U.S. over the last number of years as a direct result of this scarcity and pricing of natural gas?

Mr. KVISLE. Yes.

Mr. WHITFIELD. Yes.

Mr. ENGLISH. Certainly we have seen the evidence of the demand destruction just a couple of years ago has very definitely pushed jobs out of this country.

Mr. WHITFIELD. When we hear about loss of manufacturing jobs, we primarily hear about low wages in China or Mexico or whatever and their environmental standards are not as demanding as ours. All of this obviously fits in together. But in opening statements this morning we heard—and I am not sure which report was referred to—but I know our friend from Colorado and also California referred to a recent report from the government that said that this lack of supply of natural gas, the fact that it is not being explored in some of our public lands really has nothing to do with that.

I may be simplifying their comment, and I am sure Ms. DeGette will get to it later, but there was some comment like that. And yet you all have been testifying this morning that you need access to at least part of these public lands. Most of you agree with that statement, is that correct?

Ms. DEGETTE. Would the gentleman yield real quick?

Because, actually, they do have access to most of the public lands. The question really is, do they—in fact, I intend to ask that when it comes up to me. The question is not do they need access to public lands, because even I would agree, yes, they do. The question is, do they need access to some of the public lands like wilderness areas or national parks where drilling is not allowed as part of the management plan? Because in the vast majority of public lands, oil and gas exploration is allowed and, in fact, encouraged.

Mr. SHIMKUS [presiding]. Would the gentleman yield for a second?

We are trying to get a handle on there have been a couple of reports listed. We would like to ask a UC that these reports, whatever is being quoted, be submitted for the record so that we could review whether there is one report or two reports. If you have the exact report that is being cited, any member, if would you like to do that.

Ms. DEGETTE. Mr. Chairman, the report I am referring to is a study which was prepared at the request of Congress under provisions of the 2000 Energy Policy and Conservation Act by the Department of Interior, which was released, I believe, in December of 2002. I would add to the unanimous consent that that report be made a part of the record of this proceeding.

Mr. SHIMKUS. Is there objection? Hearing none, so ordered.

[The report is available at http://www.doi.gov/epca/]

Mr. SHIMKUS. The gentleman still has a minute.

Mr. WHITFIELD. Mr. Otter.

Mr. OTTER. I thank the gentleman for yielding.

In responding to earlier comments, I think what we need is access to public lands where the gas is; and I think that is the report—that is what we want to glean from the report. Because I think, at this point at least, if I have read the same report when I was on the Resources Committee, the report has been grossly misquoted here this morning and way above the 12 percent that was referred to earlier.

I thank the gentleman for yielding.

Mr. WHITFIELD. Of course, another comment that we can make about this, and it was referred to in your testimony, was that even if you have access and you are able to bring on new supplies of natural gas, being able to transport that and have the infrastructure in place is a serious issue as well.

So, Mr. Chairman, I see my time has already expired. So thank you.

Mr. SHIMKUS. I would like to thank my colleague from Kentucky.

Now the Chair recognizes the gentleman from Michigan for 8 minutes.

Mr. STUPAK. Thank you, Mr. Chairman; and thank you to some of our witnesses. Sorry I missed some of it. I had to run off and do a quick meeting there.

On this public lands issue, since we seem to be going back and forth on it, can you, any of you, give us an estimate how much natural gas you believe is tied up on Federal lands? Does anyone have an idea, a guesstimation? Other than a bunch. No one has an estimation. Yes, sir.

Mr. SHARPLES. At the risk of misquoting without numbers in front of me, we run—there is confusion about gas that is technologically recoverable gas that is economically recoverable and whether or not gas is available.

As to the last point, while we heard that only 12 percent of the lands in the West in this EPCA report are technically off limits, which would be the parks primarily, wilderness areas, that number goes to 40 percent if you look at areas that are subject to significant lease restrictions. The number goes even higher, and the study did not get to this issue, of lands that are subject to very significant post-leasing restrictions.

Mr. STUPAK. I understand all those differentiations, but are you all saying this is off limits? But if there is not enough gas there to go after, why worry about it then?

Mr. SHARPLES. My recollection is that, just looking at the Western States, there is an excess of 200 trillion cubic feet that is technologically recoverable.

Mr. STUPAK. Two hundred trillion. How long will that take this country in our gas consumption?

Mr. SHARPLES. Eight years.

Mr. STUPAK. There has been a lot of discussion about new gas coming in from Canada. It is going to take another pipeline, I take it, to bring that gas down, correct?

Mr. KVISLE. The issue in Canada is that western Canada produces about 17 BCF a day, and the decline rates in western Canada are such that that is about as high as it is going to get. You are not going to see a lot of increased production out of western Canada. In fact, there is increased demand in western Canada in the oil sounds so you should not count on increased imports from there.

The only Canadian source that will be significant for you in the near term is the McKenzie Delta, where about 1 BCF a day will come on stream within the next 5 or 6 years, and that will in fact flow through to U.S. markets because it is gas on the margin.

Mr. STUPAK. Would you have to build a new pipeline to get that gas down or could you use existing infrastructure?

Mr. KVISLE. That project was first proposed 30 years ago when a 3,500 kilometer pipeline to the U.S. was proposed. Today, only 1,200 kilometers is required to get it to northern Alberta where our existing systems have enough capacity to——

Mr. STUPAK. To pick it up from there.

Mr. KVISLE. Yes.

Mr. CARUSO. Congressman Stupak, we participated in this study with Interior; and our estimate is that if Federal legislation were enacted to rescind the State moratorium on outer continental shelf development, that would add about 58 trillion cubic feet of resources. And in the Rocky Mountains, if, again, legislation were enacted to allow greater access and standard lease, that would add about 70 TCF to resources available.

Mr. STUPAK. Good.

Mr. Caruso were mentioning about current prices around $5.50, near $6. You felt that it would stay that way through this year.

Mr. CARUSO. Yes, sir.

Mr. STUPAK. In January, will we see a spike like we have seen in the last couple of years?

Mr. CARUSO. This morning's spot price of natural gas at Henry Hub was $6.25 a million BTU. Our estimate is that the average price, which, of course, is based on some longer-term prices as well, would be between $5 and $6 per million BTUs. However, given possible weather conditions such as a warm summer adding to natural gas demand for electricity production or wintertime demand for heating, we could very well see price spikes that could reach $10 per million BTU in a given timeframe such as 1 week or so.

The good news is most of the historical experiences with price spikes are that they are relatively short-lived.

Mr. STUPAK. What we saw in January, 2001, with the $9 was—and it was nearly $8 last January, so you are saying January this year could get as high as 10 and these spikes are for a short period of time.

Mr. CARUSO. Certainly a possibility.

Mr. STUPAK. Is it correct to assume that most of the natural gas used in this country is used for industrial use as opposed to home heating use?

Mr. CARUSO. The industrial use is about 35 to 40 percent of our total use of natural gas.

Mr. STUPAK. In that industrial use does that include generating electricity?

Mr. CARUSO. No, that is separate.

Mr. STUPAK. How much is generation?

Mr. CARUSO. Generation of electricity, excluding co-generation, is about 24 percent.

Mr. STUPAK. So, really, about 55 to 60 percent of all the natural gas is used for industrial use, either for electric generation or for industrial use.

Mr. CARUSO. That is correct, sir.

Mr. STUPAK. But about 60 percent of American homes are heated with natural gas. Back in 1978 to 1987, Congress restricted the use of natural gas for generation of electricity under the Fuel Use Act. It required that power plants be capable of generation with natural gas or coal. That law obviously expired. Do you think it would be wise to recommend any kind of policy like that?

It seems like we have big users of natural gas for generation of electricity—I know we talk about other fuel, nuclear, or someone mentioned it earlier. Should we look for other ways to generate electricity as opposed to natural gas if we are running into this wall of short supply since so many homes are heated with natural gas?

Mr. CARUSO. Well, the EIA is not in the policy business, but you are correct that the 1990's witnessed an enormous explosion of demand for natural gas for electricity generation. We certainly expect that would continue in our long-term forecasts under existing rules and regulations.

Mr. STUPAK. But if that demand continues, there is going to be a point in time, if you can use the word, the "bubble" is going to burst here pretty quick unless you open up new areas to drilling, which may or may not happen. And if you did that, that is going to take time. And even if you do open up new areas you have to build pipelines to move it and everything else. Would it seem more practical or logical to say, hey, let's start prioritizing who is going to be using natural gas and we have to look at other energy alternatives to produce electricity?

Just throwing that out if anyone cares to comment.

Mr. Mason.

Mr. MASON. Chairman, Congressman, in my prepared comments one of the things I commented, it is the residential customer, as you indicated, who is bound to use natural gas as his energy source. But, in fact, many new boilers being constructed also have dual-fuel capability so they can go to heating fuel or even to coal. I know of two facilities in Ohio alone, industrial, not burning natural gas because they have already fuel shifted. You do have that kind of demand destruction when the price goes up into the $6 range and beyond.

Now, going back to an earlier comment, we can't play down the effect in the wintertime of peaking or spikes in gas, because, in fact, that means it has gotten unusually cold; and, obviously, that is when the residential customers need it for home heating.

Mr. STUPAK. Anyone else care to comment? Yes, sir.

Mr. KVISLE. I don't believe that the U.S. Government would need to regulate or set out guidelines for how natural gas needs to be used. I believe the market would take care of that. But I would support your question that other sources of electric generation

should be examined and should be encouraged and should be pursued.

I believe you also made the observation that this would take some time, and that is correct. In the near term we have a few options, but to use the facilities that are available to us, a significant portion of it is gas fired.

Mr. STUPAK. It seems like some of our energy policy is to get us through next January and February, then we will worry about it again next year. But if you are talking about energy, you almost have to start thinking about it long term, 10 and 15 years out, if you are going to really address it.

Thank you, Mr. Chairman.

Mr. SHIMKUS. My colleagues will have to give me more time if he takes more time off the clock.

Mr. STUPAK. I received an extra 3 minutes because I didn't do my opening.

Mr. SHIMKUS. You ran over already.

Mr. STUPAK. Three minutes, not 3 seconds.

Mr. SHIMKUS. The Chair now recognizes my colleague, Mr. Shadegg, for 5 minutes.

Mr. SHADEGG. Thank you, Mr. Chairman.

I want to try to get further information on this issue of available resources in the United States and the restriction of Federal lands. In that regard, I guess, Mr. Sharples, I want to start with you.

In your testimony, you state flatly that there is a great deal of natural gas left in basins which we are not producing from. You specifically referred to in the lower 48 there is an estimated 213 trillion cubic feet of natural gas behind below Federal lands or waters where moratoria or regulation make exploration virtually impossible.

Ms. DeGette has already raised this issue and discussed it. I think she makes the point that it is unlikely the Congress is going to open up either natural parks or wilderness areas. Your testimony does not expand on whether this supply or how much of this supply is beneath natural parks or wilderness areas. Can you further elucidate the committee on that point?

Mr. SHARPLES. I can only extrapolate on a portion of it right now. We can certainly get you the information.

The EPCA study that has been repeatedly referred to, which looked at only five basins in the West——

Mr. SHADEGG. Is this the study that Ms. DeGette referred to and put in the record?

Mr. SHARPLES. Yes, sir. About 12 percent of the lands in that study were absolutely off limits, which in my estimation would be parks and wilderness areas. The rest of the lands are either subject to restrictions on leasing or restrictions on permitting or other issues but not necessarily off limits.

As I said in my testimony, our industry is not looking for blanket access. We are looking for a reasonable balance between economic needs and environmental concerns. We do think, though, there are areas which can be exploited, and those areas can be exploited in an environmentally responsible manner. But not a blanket access, sir.

Mr. SHADEGG. But you believe that to be—I am sorry, did you say less than 12 percent of that total?

Mr. SHARPLES. No. I am saying that if we just exclude the 12 percent that is parks and wilderness and don't even touch that, of the remainder, there are certainly areas where the resource could be exploited on an environmentally responsible and economic basis.

Mr. SHADEGG. In your testimony also, Mr. Sharples, I believe you make a reference to two studies. You say a National Petroleum Council study and a U.S. Department of Interior study, both of which say that there is a tremendous amount of natural gas available in the Rocky Mountain region that is available and is not, as I understand it, under either national parks or wilderness areas. Is that correct?

Mr. SHARPLES. Yes, sir.

Mr. SHADEGG. Is this one of those two studies? This is a natural gas—meeting the challenges of the Nation's growing natural gas demand?

Mr. SHARPLES. I believe so, sir.

Mr. SHADEGG. This particular study identifies, I believe, 137 trillion cubic feet in the Rocky Mountain area that is restricted; and it also references 31 trillion cubic feet off the east coast of the United States. Could you get for the committee information on how much of that is in these truly environmentally sensitive areas where no one is going to agree to go in and explore a wilderness area or a national park versus how much of it is restricted for other reasons?

Mr. SHARPLES. We will work on that for you, sir.

Mr. SHADEGG. Mr. English, you testified on the same point. Are you familiar with the study Ms. DeGette referred to?

Mr. ENGLISH. No, I am not an expert on that.

Mr. SHADEGG. Are you familiar with the Department of Interior study which reached the conclusion that has these numbers in it showing substantial resources in the Rocky Mountains and off the east coast that are restricted?

Mr. ENGLISH. I am familiar with the report.

Mr. SHADEGG. Is it your belief that there are substantial quantities there that could be obtained without either going into national parks or going into wilderness areas?

Mr. ENGLISH. I am not expert enough to answer that, either.

Mr. SHADEGG. Okay. Well, if you could get us information on that, I think it would be tremendous help to the committee. I think there would be consensus that we are not going to go into wilderness areas or national parks. But it seems to me if there are unduly restrictive provisions of our other environmental laws where the areas are not in fact as sensitive, I think we could build a consensus around going after them; and the book that the Chairman, Mr. Shimkus, referred to talked about the fact that some of these supplies could be accessed.

Yes, sir.

Mr. SHARPLES. If I may, sir. We referred repeatedly to this Energy Policy and Conservation Act phase one study about areas that are——

Mr. SHADEGG. EPCA you are referring to that Ms. DeGette has?

Mr. SHARPLES. Yes, sir, on these five basins. I think it is important to go beyond what this study did and look beyond just what is technically off limits and look at the effect of post-leasing restrictions, difficulty in acquiring permits, time during which one is allowed to operate. Things that, because of the relatively low margins of some of these properties, effectively deny access and see if there are areas where improvement is possible in that area as well.

Mr. SHADEGG. Would it be your recommendation—my time has run out. But would it be your recommendation that the Congress order or direct that a study of all those issues be conducted? Or are the resource information already available? Is the information available?

Mr. SHARPLES. It is my personal opinion that I don't believe the information is available.

Mr. SHADEGG. So we need to take a look at that, given the price structure and the pieces of these restrictions that cause the price to go up.

Mr. SHIMKUS. The gentleman's time has expired.

The Chair recognizes my colleague from Colorado for 5 minutes.

Ms. DEGETTE. Thank you, Mr. Chairman.

You know, I think we are finding some common ground here. This is great.

Mr. Sharples, in your written statement you said there were two things the government needed to do to increase natural gas development: one, allow greater access to certain resource-rich Federal lands and waters that are currently closed to exploration; and, two, create a regulatory framework that allows and encourages exploration. But when I first read this I thought maybe you were talking about drilling in wilderness areas and national parks, but that is not what you are talking about at all, is it?

Mr. SHARPLES. That is certainly not the major thrust of what we are looking at.

Ms. DEGETTE. But I think you just told Mr. Shadegg you don't think we should drill in those areas.

Mr. SHARPLES. I personally don't. If an adequate assessment of economic benefits versus environmental issues have been taken into account, no. I think there are a lot of other things we can do.

Ms. DEGETTE. Right. And what you are really concerned about is what you just said, which is laws and regulations and restrictions on leases that in effect stop exploration because they make it economically infeasible, right?

Mr. SHARPLES. That is correct, ma'am.

Ms. DEGETTE. And do you have some sense or do you know about a study about what percentage of the public lands we are looking at where those types of barriers exist to drilling?

Mr. SHARPLES. I don't believe that has been quantified. In fact, as I mentioned, I think that a phase two of the EPCA study that looked beyond just what is available for leasing would be very, very valuable.

Ms. DEGETTE. So do we have any other information? And, by the way, to Mr. Shadegg, the study I was referring to is a Department of Interior study, okay?

But so what you are saying is, let us do another study which shows what kinds of regulatory barriers are there to the develop-

ment of the other lands that should be available for development, right?

Mr. SHARPLES. Yes, ma'am.

Ms. DEGETTE. Well, I think that is a great idea, too; and I think, Mr. Shadegg, maybe we can work on that.

What kinds of regulatory barriers exist to development of natural gas in areas where it would be acceptable?

Mr. SHARPLES. We could perhaps start—we have already discussed whether or not you can lease and then what kind of restrictions on operations are placed in leases. Those are relatively easy to quantify.

Ms. DEGETTE. And do we have any sense about those restrictions that are included in leases, how much development those are stopping?

Mr. SHARPLES. Actually, to some extent that is addressed in phase one of this EPCA study. What is not is extensive delays in granting leases—excuse me, granting permits to operate, extensive delays once the permit for an exploration well is granted, and assuming it is successful in going on to development.

Ms. DEGETTE. I hate to interrupt you. They only give us 5 minutes.

Mr. SHARPLES. But a lot of those kinds of technical issues.

Ms. DEGETTE. Right. And a lot of those barriers are due to what Mr. English was talking about, which is insufficient resources to the regulators who are supposed to be granting these, right?

Mr. SHARPLES. Absolutely, ma'am.

Ms. DEGETTE. So one thing that we could really do on a bipartisan basis that could help, that Congress could do, is beef up resources in particular to the BLM to allow regulators to review more quickly these leasing applications.

Mr. SHARPLES. We would wholeheartedly support that.

Ms. DEGETTE. Now, Mr. English also talks and others on the panel talk about a lack of resources going toward infrastructure. Let us say you go into some of these areas that are remote. I have been to many of these areas in the Rocky Mountains. Let us say you go in and you find a successful well. Getting the natural gas out is also a problem, correct, Mr. English?

Mr. ENGLISH. That is true. It does——

Ms. DEGETTE. Can you speak up?

Mr. ENGLISH. It does indeed take infrastructure to move the natural gas from where it is found to move it to people's homes and businesses.

Ms. DEGETTE. And let us say we eliminate some of the regulatory barriers and the regulatory delays. What can we do to speed up development of infrastructure so we can actually remove the resources and get it into people's homes?

Mr. ENGLISH. Well, certainly what has been discussed is appropriate, that we speed up the actual regulatory process so that those particular facilities can be sited. And certainly the action taken by the House in order to speed up depreciation of those investments is also a big——

Ms. DEGETTE. That will help with development of infrastructure. Great.

Thank you so much, Mr. Chairman.

Mr. SHIMKUS. I want to thank my colleague, and I will now recognize myself for 5 minutes. And let me start with Mr. English.

If natural gas becomes cost prohibitive or physically unavailable, what will the people use as an alternative?

Mr. ENGLISH. Well, first of all, I don't think it is going to become unavailable. Certainly——

Mr. SHIMKUS. Well, okay. Let us don't use "unavailable." Let us use "unable to deliver."

Mr. ENGLISH. Certainly, we have explored in the discussions today the fact that, under the right circumstances, there can indeed be scenarios where there could be shortages. All gas distribution companies in this country have emergency procedures that deal with those kinds of situations, because you can never predict how cold a winter is going to be or just what kind of problems you may face in terms of supply at any given point in time.

So the situation is if there is a—if there is not enough available at any given point in time, then the procedures are such that we begin to not serve particular customers, which generally starts out with industry and in many cases with electric generation. The last thing on the list ends up being homes and schools and that sort of thing. Those are the kinds of problems we faced in the 1970's and certainly hoped that we wouldn't have to face that kind of thing again, which is the reason that we are here today.

Mr. SHIMKUS. Let me continue on. I have always spoken on this committee about a diversified energy portfolio and the fact that we ought to—the market will be the best means of distributing the best fuel at the lowest price, if you don't put external demands or, as Mr. Whitfield said, the cost of doing business, sometimes a successive government regulation, whether it is not able to get natural gas off of Federal lands.

Let me make a point just for clarification. Public land is by definition multi-use. That is an important point to be made. Public lands is multi-use land versus wilderness areas which are defined as not being multi-use. So this whole debate about public lands, the use of those public lands for exploration and recovery is well within the purview of what we ought to be doing as good public policy.

I wanted to ask Mr. Caruso. On your report, you mentioned unconventional recovery. In fact, I lost what—I think it was on page 17—and you talked about the increase from, I don't know, 28 to 36 percent by 2025. That is probably not the exact percentage. In that unconventional recovery, are you talking about coal, coal bed methane gas?

Mr. CARUSO. Yes, sir. It is not only coal bed methane but also tight sands gas, which is a large part of the unconventional resources and is the largest single block of new gas resources that we have in our long-term forecast. That gets us to the 26.7-26.8 TCF by 2025.

Mr. SHIMKUS. And I want to just mention that, because of the line of questions of the ranking member and Mr. Boucher and also my friend, Mr. Whitfield—because, obviously, in coal States with untouched locations still available, plus old mines that have been left, there is an opportunity there in the extraction of coal bed methane to meet those needs.

I wanted also to go to Mr. Currie on this—just this debate. I made a comment a few minutes ago about the market, and I think probably you all look at the market based upon investments. I had a new natural gas line built in my congressional district last summer. I think the company was NI Gas that put it in, and at great expense. Worked probably 5 or 6 months, a lot of equipment, a lot of land, and now it is in place.

Can we in this debate talk about—when I talk about the diversified energy portfolio, can we trust the market if we—trying to make things as equal as possible from the cost of doing business from the government regulatory end, to be a better means of distributing economic growth and opportunity and a return on the investment, should we allow the market to determine which fuel is the best use for which use, versus what you will hear here is an attempt for government to manipulate and micromanage the market based upon our perception of how we can best determine the best fuel for the best use?

Mr. CURRIE. I think, in terms of thinking about the market, it doesn't care about the price volatility. It actually cares about the expected rate of return off of these assets. And we look at a competitive marketplace. It is just going to build assets to just the amount that it needs to keep the system running, which is what we are currently seeing at this point right now. It will not build excess capacity beyond what is required that would actually diminish the volatility. So even if we saw the supply problem today and found all the supply and brought it out there, as long as we have the market continuing building the infrastructure, they are just going to build enough to get by.

So that question really becomes, how do you incentivize the market to build the excess or spare capacity that will actually tame the volatility? Because, ultimately, when we see these prices—I want to emphasize, prices were $2 or $1.80 18 months ago, and they were $10 24 months ago. The cycle goes up and down, but the average price has only creeped up modestly, and the rates returns have only gone up modestly.

So when we think about the rates return, they don't care about the volatility. The consumer, the producer cares about the volatility. So if we want to actually incentivize that spare capacity to take down the volatility, it is going to take more dramatic action than simply letting the market function.

Mr. SHIMKUS. Is there a role for the government in that aspect?

Mr. CURRIE. I can see the government playing a role, but one of market intervention, but rather just build these pipelines and storage facilities just like they build freeways or toll roads. Essentially, there are—if you want the spare capacity. If you are fine with the high level of volatility, that is what the market will provide you with. If you want to have the spare capacity to reduce the volatility, it will take more dramatic action. By not advocating regulation of prices or regulation of the market in general, it is just like building a road and letting the market function on its own.

Mr. SHIMKUS. I am out of time.

I would like to now go to my colleague from Texas, Mr. Green, for 5 minutes.

Mr. GREEN. Thank you, Mr. Chairman.

I have a question for both Mr. Currie and also Mr. Caruso, although anyone can chime in. What policies could States and the Federal Government enact to encourage the needed energy infrastructure investment, including sanctity of a long-term contract? But if we make changes to pipeline siting policy like we did in the energy bill for power lines at FERC, are local obstacles reaching a level that require Federal intervention for pipelines?

Mr. KVISLE. TransCanada and its partners have worked for 5 or 6 years to build a pipeline into the New York City region that has been stymied by local opposition. That local opposition is for whatever reasons, but it has proved to be a significant barrier to the construction of pipelines like that. I cite one example, but there are dozens of those in the United States, and equally they exist in Canada. So I do believe that some means of addressing this problem needs to be examined.

Mr. GREEN. Anyone else? I mean, I understand the New York situation.

Mr. CURRIE. In general, we would argue that the restrictions on the development of infrastructure is one of the forces currently impeding the rates return on these assets. Freeing up these restrictions would obviously help the matter. But, again, I want to emphasize, the real question is, you need to have not just enough capacity to function, but you need to have spare capacity if you want the volatility reduced, which is going to be much more difficult than just lifting the current restrictions on where you can develop pipelines.

Mr. GREEN. Anyone else?

Thank you, Mr. Chairman.

Mr. SHADEGG [presiding]. Does the gentleman yield back his time?

Mr. GREEN. I yield back my time.

Mr. SHADEGG. Okay. We have been joined by the gentleman from Massachusetts, Mr. Markey. There being no one on the other side, the Chair would recognize him for 8 minutes.

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

Mr. Caruso, to what extent does the EIA believe that the natural gas prices track prices for crude oil? Historically, isn't there a rough overall correlation between the two?

Mr. CARUSO. Yes, sir. There is a certain amount of competition between natural gas and oil prices to the extent that certain users can switch to, perhaps, residual fuel oil, distillate fuel oil. There is a linkage between the two.

Mr. MARKEY. So when oil prices spiked upwards in the months leading up to the war in Iraq, that played a significant role, did it not, in driving the price of natural gas upwards as well?

Mr. CARUSO. It was one of the reasons that led to the upward pressure.

Mr. MARKEY. Was it a significant factor, in your mind?

Mr. CARUSO. I think it was an important factor, yes. There were, obviously, the points made earlier about whether the fact that we had low storage and the fact that, with high oil prices, the incentive to switch out of gas into residual fuel oil was less significant. So it was a number of factors, and that was one of them.

Mr. MARKEY. So Chairman Greenspan, who is testifying later this afternoon, noted in a recent speech that, while oil prices have declined since the end of the war, that natural gas prices have remained high. Do you agree with that?

Mr. CARUSO. That is correct. The low storage of gas continued to put upward pressure on demand to refill that storage, which is the main reason for that.

Mr. MARKEY. You are saying that is the key factor in the delinkage between the natural gas and crude oil prices?

Mr. CARUSO. That has been the key factor since the end of the winter.

Mr. MARKEY. And the cause of that is?

Mr. CARUSO. That we came out of the winter with such a low level of working gas in storage, there was unusually high demand for refilling that storage in April and May, and, as mentioned in the testimony, we expect that to continue throughout the summer in order to get us where we need to be by the winter.

Mr. MARKEY. Going back to your earlier point, historically, though, and on a continuing basis, there is an important link between the price of crude oil and the price of natural gas? That continues to be very real. It is a factor.

Mr. CARUSO. Yes. It is a factor. Yes, sir.

Mr. MARKEY. And it is more than at the margin. It is a significant factor. It is an important factor, in your own words.

Mr. CARUSO. And as you know, at the margin it can be important. It can be important because of the marginal nature of the pricing of energy. Supply is very inelastic, particularly when you reach the kind of storage levels that we are at right now.

Mr. MARKEY. Now, on the front page of today's New York Times, Mr. Caruso, there is a report that widespread looting has left Iraq's oil industry in ruins, and that, as a result, it could take several months to a year to get Iraqi oil production back to its pre-war levels. Given this important linkage between crude oil and the global marketplace and the price of natural gas, do you think that, as a result of that, that there is a higher price for natural gas because the price for crude oil is staying unnaturally high because Iraq is not coming back on line as quickly as had been projected?

Mr. CARUSO. I don't think right now that is a major factor.

Mr. MARKEY. Is it a factor?

Mr. CARUSO. It is a factor. But I would downplay its importance at this point in time, given the seasonal nature of where we are. In other words, the winter spikes and pressure on prices was partly due to the economic disincentive to switch in many cases. Right now, you don't have that. That circumstance does not exist.

Mr. MARKEY. Well, the point I am making is that the Bush Administration secured the oil fields from being blown up by Saddam Hussein, but they did not secure the oil fields from being systematically dismantled by looters, accomplishing the very same goal. So the Bush Administration touted their great success in ensuring that the oil fields were secured in the first 2 weeks of the war, but then they did not secure the oil fields from being looted and, as a result, we have not secured the peace, either in terms of the revenues being used to rebuild Iraq or in terms of that additional oil going on to the global marketplace and having an impact as a re-

sult upon the competitiveness of natural gas as a substitute and putting pressure, downward pressure on the price of natural gas. Do you agree with that?

Mr. CARUSO. It is outside of our analysis on the point you just made. But I think that it is much too soon to give up on how quickly the Iraqi oil can come back into the marketplace.

Mr. MARKEY. Well, when will we know that answer, Mr. Caruso? Because, obviously, the natural gas marketplace is dependent upon their bet on that issue. If they think going through the end of this year and into the coming winter that that additional 2 million barrels of Iraqi oil at the margin is not going into the marketplace, that obviously is going to make it more likely that they have got a much better marketplace to sell their natural gas and to keep prices high, affecting the consumers of New England and those all across the country. This is a huge mistake by the Bush Administration if it is not rectified by the fall.

Mr. CARUSO. Our Short-Term Energy Outlook has crude oil prices trending downward, given the return of Iraq and the fact that other producers continue to produce.

Mr. MARKEY. So when do you expect then, Mr. Caruso, for natural gas prices to trend down, given all of the identical factors?

Mr. CARUSO. I think the main factor is getting natural gas into storage.

Mr. MARKEY. Well, when will that occur?

Mr. CARUSO. I think——

Mr. MARKEY. When will the prices trend down?

Mr. CARUSO. We should start seeing prices coming down a bit in 2004. And, as I mentioned earlier, over a longer term we see them coming back into the $3 to $4 per million BTU range.

Mr. MARKEY. So if natural gas prices are high and likely to remain so in the near future, why isn't the profit incentive sufficient for companies to increase storage and increase production as well?

Mr. CARUSO. I think the incentive is there, and we are now seeing some refueling going on at a good pace. Our expectations are that the drilling rig activities that have increased this year and the additional monies available will bring forth some additional supplies. But it takes time. It is not instantaneous.

Mr. SHADEGG. The time of the gentleman has expired—well expired.

Mr. MARKEY. Thirty-two seconds. For anyone who is watching C-SPAN. You see, the Republican chairman thinks that 32 seconds is well expired.

Mr. SHADEGG. And I think we gave you ample time.

I don't believe there are any further members. I want to thank this panel for their testimony. We will recess until 2 o'clock. We very much appreciate each of you for your testimony.

[Brief recess.]

Chairman TAUZIN. The committee will please come to order. Let me first announce that the Ranking Member Dingell is on his way, but I think we need to get started to accommodate our guest today. It is my extreme pleasure to introduce for the committee Mr. Alan Greenspan, the Chairman of the Board of Governors of the Federal Reserve System, who has agreed to come and testify today on this

most important topic of natural gas and its effect upon the U.S. economy.

We certainly want to welcome you, Mr. Greenspan. You have been a frequent visitor to the committee in the past, and we want to thank you for all the courtesies and the time you have spent with us both in public meetings such as this and when we have called upon you for advice and counsel. So we welcome you today.

I ask unanimous consent that Mr. Greenspan be allowed 15 minutes to present his statement.

Mr. Greenspan, it is our intention to try to get you out of here by 3. I understand that is your time schedule, and we will accommodate that.

Mr. Greenspan.

STATEMENT OF ALAN GREENSPAN, CHAIRMAN, BOARD OF GOVERNORS, FEDERAL RESERVE SYSTEM

Mr. GREENSPAN. Thank you very much, Mr. Chairman. I am very thankful to be invited before this committee on what I consider to be a most important subject, one which has not been getting as much notice as I think it deserves considering the broad nature of the policies that are related to it.

As you know, Mr. Chairman and members of the committee, in recent months, in response to very tight supplies, prices of natural gas have increased sharply. Working gas in storage is currently at very low levels relative to its seasonal norm because of a colder-than-average winter and a seeming inability of increased gas well drilling to significantly augment net marketed production. Canada, our major source of imported natural gas, has had little room to expand shipments to the United States, and our limited capacity to import liquefied natural gas effectively restricts our access to the world's abundant supplies of gas.

Our inability to increase imports to close a modest gap between North American demand and production, a gap, incidentally, we can almost always close in the case of oil, is largely responsible for the marked rise in natural gas prices over the past year. Such price pressures are not evident elsewhere. Competitive crude oil prices, after wide gyrations related to the war in Iraq, are now only slightly elevated from a year ago. And where spot markets for natural gas exist, such as in Great Britain, prices exhibit little change from a year ago. In the United States, rising demand for natural gas, especially as a clean-burning source of electric power, is pressing against a supply essentially restricted to North American production.

Given the current infrastructure, the U.S. market for natural gas is mainly regional, is characterized by relatively longer-term contracts, and is still regulated, but less so than in the past. As a result, residential and commercial prices of natural gas respond sluggishly to movements in the spot price. Thus, to the extent that natural gas consumption must adjust to limited supplies, most of the reduction must come from the industrial sector and, to a lesser extent, utilities.

Yesterday the price of gas for delivery in July closed at $6.31 per million Btu. That contract sold for as low as $2.55 in July of 2000 and for $3.65 a year ago. Futures markets project further price in-

creases through the summer cooling season to the peak of the heating season next January. Indeed, market expectations reflected in option prices imply a 25 percent probability that the peak price will exceed $7.50 per million Btu.

Today's tight natural gas markets have been a long time in coming, and futures prices suggest that we are not apt to return to earlier periods of relative abundance and low prices any time soon. It was little more than a half century ago that drillers seeking valuable crude oil bemoaned the discovery of natural gas. Given the lack of adequate transportation, wells had to be capped, or the gas flared. As the economy expanded after World War II, the development of a vast interstate transmission system facilitated widespread consumption of natural gas in our homes and business establishments. On a heat-equivalent basis, natural gas consumption by 1970 had risen to three-fourths of that of oil. But natural gas consumption lagged in the following decade because of competitive incursions from coal and nuclear power. Since 1985, natural gas has gradually increased its share of total energy use and is projected by the Energy Information Administration to gain share over the next quarter century, owing to its status as a clean-burning fuel.

Recent years' dramatic changes in technology are making existing energy reserves stretch further while keeping long-term energy costs lower than they otherwise would have been. Seismic techniques and satellite imaging, which are facilitating the discovery of promising new natural gas reservoirs, have nearly doubled the success rate of new-field wildcat wells in the United States during the past decade. New techniques allow far deeper drilling of promising fields, especially offshore. The newer recovery innovations reportedly have raised the average proportion of gas reserves eventually brought to the surface. Technologies are facilitating Rocky Mountain production of tight sands gas and coalbed methane. Marketed production in Wyoming, for example, has risen from 3.4 percent of total U.S. output in 1996 to 7.1 percent last year.

One might expect that the dramatic shift away from hit-or-miss methods toward more advanced technologies would have lowered the cost of developing new fields and, hence, the long-term marginal costs of new gas. Indeed, those costs have declined, but by less than might have been the case, because much of the innovation in oil and gas development outside of OPEC has been directed at overcoming an increasingly inhospitable and costly exploratory physical environment.

Moreover, improving technologies have increased the depletion rate of newly discovered gas reservoirs, placing a strain on supply that has required increasingly larger gross additions from drilling to maintain any given level of dry gas production. Depletion rates are estimated to have reached 27 percent last year compared with 21 percent as recently as 5 years ago. The rise has been even more pronounced for conventionally produced gas because tight sands gas, which comprises an increasing share of new gas finds, exhibits a slower depletion rate than conventional wells.

Improved technologies, however, have been unable to prevent the underlying long-term price of natural gas in the United States from rising. This is most readily observed in markets for natural gas

where contract delivery is sufficiently distant to allow new supply to be developed and brought to market. That price has risen gradually from $2 per million Btu in 1997 for delivery in 2000 and presumably well beyond to more than $4.50 for delivery in 2009, the crude oil heating equivalent rising from less than $12 a barrel to $26 a barrel. Over the same period, the distant futures price of light sweet crude oil has edged up only $4 per barrel and is selling at a historically rare discount to comparably dated natural gas.

Because gas is particularly challenging to transport in its cryogenic form as a liquid, imports of LNG have been negligible. Environmental and safety concerns and cost have limited the number of LNG terminals and imports of LNG. In 2001, LNG imports accounted for only 1 percent of U.S. gas supply. Canada, which has recently supplied a sixth of our consumption, has little capacity to significantly expand its exports, in part because of the role that Canadian gas plays in supporting growing oil production from tar sands.

Given notable cost reductions for both liquefaction and transportation of LNG, significant global trade is developing, and high gas prices projected in the American distant futures market have made us a potential very large importer. Worldwide imports of natural gas in 2000 were only 26 percent of world consumption, compared to 50 percent for oil.

Even with markedly less geopolitical instability confronting world gas than world oil in recent years, spot gas prices have been far more volatile than those for oil, doubtless reflecting, in part, less developed global trade. The updrift and volatility of the spot price for gas have put significant segments of the North American gas-using industry in a weakened competitive position. Unless this competitive weakness is addressed, new investment in these technologies will flag.

Increased marginal supplies from abroad, while likely to notably damp the levels and volatility of American natural gas prices, would expose us to possibly insecure sources of foreign supply as it has for oil. But natural gas reserves are somewhat more widely dispersed than those of oil for which three-fifths of proved world reserves reside in the Middle East. Nearly two-fifths of world natural gas reserves are in Russia and its former satellites, and one-third are in the Middle East.

Creating a price-pressure safety valve through larger import capacity of LNG need not unduly expose us to potentially unstable sources of imports. There are still numerous unexploited sources of gas production in the United States. We have been struggling to reach an agreeable tradeoff between environmental and energy concerns for decades. I do not doubt we will continue to fine-tune our areas of consensus, but it is essential that our policies be consistent. 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 LNG. Such contradictions are resolved only by debilitating spikes in price.

In summary, the long-term equilibrium price for natural gas in the United States has risen persistently during the past 6 years from approximately $2 per million Btu to more than $4.50. The perceived tightening of long-term demand/supply balances is begin-

ning to price some industrial demand out of the market. It is not clear whether these losses are temporary, pending a fall in price, or permanent.

Such pressures do not arise in the U.S. market for crude oil. American refiners have unlimited access to world supplies, as was demonstrated most recently when Venezuelan oil production shut down. Refiners were able to replace lost oil with supplies from Europe, Asia, and the Middle East. If North American natural gas markets are to function with the flexibility exhibited by oil, unlimited access to the vast world reserves of gas is required. Markets need to be able to effectively adjust to unexpected shortfalls in domestic supply. Access to world natural gas supplies will require a major expansion of LNG terminal import capacity. Without the flexibility such facilities will impart, imbalances in supply and demand must inevitably engender price volatility.

As the technology of LNG liquefaction and shipping has improved, and as safety considerations have lessened, a major expansion of U.S. import capability appears to be under way. These movements bode well for widespread natural gas availability in North America in the years ahead.

Thank you very much, Mr. Chairman. I look forward to your questions.

[The prepared statement of Alan Greenspan follows:]

PREPARED STATEMENT OF ALAN GREENSPAN, CHAIRMAN, BOARD OF GOVERNORS, FEDERAL RESERVE SYSTEM

In recent months, in response to very tight supplies, prices of natural gas have increased sharply. Working gas in storage is currently at very low levels relative to its seasonal norm because of a colder-than-average winter and a seeming inability of increased gas well drilling to significantly augment net marketed production. Canada, our major source of imported natural gas, has had little room to expand shipments to the United States, and our limited capacity to import liquefied natural gas (LNG) effectively restricts our access to the world's abundant supplies of gas.

Our inability to increase imports to close a modest gap between North American demand and production (a gap we can almost always close in oil) is largely responsible for the marked rise in natural gas prices over the past year. Such price pressures are not evident elsewhere. Competitive crude oil prices, after wide gyrations related to the war in Iraq, are now only slightly elevated from a year ago, and where spot markets for natural gas exist, such as in Great Britain, prices exhibit little change from a year ago. In the United States, rising demand for natural gas, especially as a clean-burning source of electric power, is pressing against a supply essentially restricted to North American production.

Given the current infrastructure, the U.S. market for natural gas is mainly regional, is characterized by relatively longer term contracts, and is still regulated, but less so than in the past. As a result, residential and commercial prices of natural gas respond sluggishly to movements in the spot price. Thus, to the extent that natural gas consumption must adjust to limited supplies, most of the reduction must come from the industrial sector and, to a lesser extent, utilities.

Yesterday the price of gas for delivery in July closed at $6.31 per million Btu. That contract sold for as low as $2.55 in July 2000 and for $3.65 a year ago. Futures markets project further price increases through the summer cooling season to the peak of the heating season next January. Indeed, market expectations reflected in option prices imply a 25 percent probability that the peak price will exceed $7.50 per million Btu.

Today's tight natural gas markets have been a long time in coming, and futures prices suggest that we are not apt to return to earlier periods of relative abundance and low prices anytime soon. It was little more than a half-century ago that drillers seeking valuable crude oil bemoaned the discovery of natural gas. Given the lack of adequate transportation, wells had to be capped or the gas flared. As the economy expanded after World War II, the development of a vast interstate transmission system facilitated widespread consumption of natural gas in our homes and business

establishments. On a heat-equivalent basis, natural gas consumption by 1970 had risen to three-fourths of that of oil. But natural gas consumption lagged in the following decade because of competitive incursions from coal and nuclear power. Since 1985, natural gas has gradually increased its share of total energy use and is projected by the Energy Information Administration to gain share over the next quarter century, owing to its status as a clean-burning fuel.

Recent years' dramatic changes in technology are making existing energy reserves stretch further while keeping long-term energy costs lower than they otherwise would have been. Seismic techniques and satellite imaging, which are facilitating the discovery of promising new natural gas reservoirs, have nearly doubled the success rate of new-field wildcat wells in the United States during the past decade. New techniques allow far deeper drilling of promising fields, especially offshore. The newer recovery innovations reportedly have raised the average proportion of gas reserves eventually brought to the surface. Technologies are facilitating Rocky Mountain production of tight sands gas and coalbed methane. Marketed production in Wyoming, for example, has risen from 3.4 percent of total U.S. output in 1996 to 7.1 percent last year.

One might expect that the dramatic shift away from hit-or-miss methods toward more advanced technologies would have lowered the cost of developing new fields and, hence, the long-term marginal costs of new gas. Indeed, those costs have declined, but by less than might have been the case because much of the innovation in oil and gas development outside of OPEC has been directed at overcoming an increasingly inhospitable and costly exploratory physical environment.

Moreover, improving technologies have also increased the depletion rate of newly discovered gas reservoirs, placing a strain on supply that has required increasingly larger gross additions from drilling to maintain any given level of dry gas production. Depletion rates are estimated to have reached 27 percent last year, compared with 21 percent as recently as five years ago. The rise has been even more pronounced for conventionally produced gas because tight sands gas, which comprises an increasing share of new gas finds, exhibits a slower depletion rate than conventional wells.

Improved technologies, however, have been unable to prevent the underlying long-term price of natural gas in the United States from rising. This is most readily observed in markets for natural gas where contract delivery is sufficiently distant to allow new supply to be developed and brought to market. That price has risen gradually from $2 per million Btu in 1997 for delivery in 2000, and presumably well beyond, to more than $4.50 for delivery in 2009, the crude oil heating equivalent of rising from less than $12 per barrel to $26 per barrel. Over the same period, the distant futures price of light sweet crude oil has edged up only $4 per barrel and is selling at a historically rare discount to comparably dated natural gas.

Because gas is particularly challenging to transport in its cryogenic form as a liquid, imports of LNG have been negligible. Environmental and safety concerns and cost have limited the number of LNG terminals and imports of LNG. In 2001, LNG imports accounted for only 1 percent of U.S. gas supply. Canada, which has recently supplied a sixth of our consumption, has little capacity to significantly expand its exports, in part because of the role that Canadian gas plays in supporting growing oil production from tar sands.

Given notable cost reductions for both liquefaction and transportation of LNG, significant global trade is developing. And high gas prices projected in the American distant futures market have made us a potential very large importer. Worldwide imports of natural gas in 2000 were only 26 percent of world consumption, compared to 50 percent for oil.

Even with markedly less geopolitical instability confronting world gas than world oil in recent years, spot gas prices have been far more volatile than those for oil, doubtless reflecting, in part, less-developed global trade. The updrift and volatility of the spot price for gas have put significant segments of the North American gas-using industry in a weakened competitive position. Unless this competitive weakness is addressed, new investment in these technologies will flag.

Increased marginal supplies from abroad, while likely to notably damp the levels and volatility of American natural gas prices, would expose us to possibly insecure sources of foreign supply, as it has for oil. But natural gas reserves are somewhat more widely dispersed than those of oil, for which three-fifths of proved world reserves reside in the Middle East. Nearly two-fifths of world natural gas reserves are in Russia and its former satellites, and one-third are in the Middle East.

Creating a price-pressure safety valve through larger import capacity of LNG need not unduly expose us to potentially unstable sources of imports. There are still numerous unexploited sources of gas production in the United States. We have been struggling to reach an agreeable tradeoff between environmental and energy con-

cerns for decades. I do not doubt we will continue to fine-tune our areas of consensus. But it is essential that our policies be consistent. 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 LNG. Such contradictions are resolved only by debilitating spikes in price.

In summary, the long-term equilibrium price for natural gas in the United States has risen persistently during the past six years from approximately $2 per million Btu to more than $4.50. The perceived tightening of long-term demand-supply balances is beginning to price some industrial demand out of the market. It is not clear whether these losses are temporary, pending a fall in price, or permanent.

Such pressures do not arise in the U.S. market for crude oil. American refiners have unlimited access to world supplies, as was demonstrated most recently when Venezuelan oil production shut down. Refiners were able to replace lost oil with supplies from Europe, Asia, and the Middle East. If North American natural gas markets are to function with the flexibility exhibited by oil, unlimited access to the vast world reserves of gas is required. Markets need to be able to effectively adjust to unexpected shortfalls in domestic supply. Access to world natural gas supplies will require a major expansion of LNG terminal import capacity. Without the flexibility such facilities will impart, imbalances in supply and demand must inevitably engender price volatility.

As the technology of LNG liquefaction and shipping has improved, and as safety considerations have lessened, a major expansion of U.S. import capability appears to be under way. These movements bode well for widespread natural gas availability in North America in the years ahead.

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

It is the Chairman's pleasure to recognize Members for questions in order of their appearance this morning, and I will advise all Members Mr. Greenspan needs to be out of here at 3, so we will hold to a strict timetable. The Chair recognizes himself for—quickly for 5 minutes under the rules.

Mr. Chairman, you obviously talk about the updrift in volatility of the spot price for gas having put a significant segment of the North American gas-using industries in a weakened competitive position. I suppose the first question we need to know is what is your appraisal of that weakened competitive position if it maintains? Does that bode any serious consequences for the overall economy?

Mr. GREENSPAN. Eventually it has significant impacts. It has not as yet had impacts which one sees in the macrodata. I mean, for example, in a number of subtle places like nonfinancial nonenergy corporations the rise in natural gas costs has knocked a couple of tenths off profit margins. And since profit margins are a critical aspect in general of capital investment and broad economic development, this is one of many areas where you can begin to see the impact of the big surge in gas prices. And have no doubt if it continues, and if we stay at these very elevated prices, we are going to see some erosion in a number of macroeconomic variables which are not evident at this stage.

Chairman TAUZIN. At the heart of your evaluation of the problem is this sort of schizophrenic position our country finds itself in where we are encouraging dramatically the use of natural gas because of its environmental status, and at the same time we are obviously operating without encouraging new supplies—you mentioned liquefied natural gas as an example of something we might want to encourage dramatic increases to satisfy some of that new demand. Are there other ways this country ought to think about satisfying that demand we are artificially creating?

Mr. GREENSPAN. Mr. Chairman, I think we are all quite familiar with a number of different potential sources of supply which have not as yet be exploited in this country. And here where the major concerns arise, there are obviously tradeoffs, as you well know better than I, between environmental concerns and energy. And it is not as though there is a formula which suggests a tradeoff. There is no joining of value systems, and the Congress has got to make some very important judgments with respect to this. I mean, we obviously know that the tight sands technology, especially in the Rocky Mountains, is one area where fairly significant new "lower 48" natural gas capabilities reside. We also know that there are potentially significant additional reserves. We have got Alaska, we have the potential of not only an Alaska pipeline bringing down Alaskan gas, but also the MacKenzie River line bringing additional reserves down from Canada as well. So we have innumerable sources.

The reason I put emphasis especially on LNG is that if we could get that market functioning, it is a vast reserve. I wouldn't say unlimited, obviously, but it has many of the characteristics of what our international oil market is. As you know, the size of the international market in gas relative to consumption is half that of oil, and it is a crucial safety valve in maintaining price stability in oil, and it could be in gas as well.

Chairman TAUZIN. Well, again, in analyzing that as the answer to our demand shortfalls, and to what could happen economically if we don't address it relatively soon, we turn to foreign imports. Would that not further exacerbate the problems we have with foreign trade deficits and the problems that has on our economy?

Mr. GREENSPAN. There are innumerable questions that one has to confront with respect to foreign sources of oil, gas and everything else, national security being obviously at the top of the list. This is a whole series of tradeoffs. I think we can define what the nature of the gas market is or should be under various different legislative initiatives, and we can define what we reasonably well know is available with respect to both proved and nonproved reserves, especially in nonconventional gas.

Chairman TAUZIN. My time has run. How much time do we have to find an answer before we have serious economic impacts?

Mr. GREENSPAN. Well, that is extremely difficult to say. All we can really rest upon is our best judgment of what the markets are telling us. And we do have 6-year-forward markets in natural gas as we have in crude oil. Those markets are telling us that $2 gas is a historic relic, at least for the time being. And a very significant amount of natural gas using infrastructure in the American economy was based on $2 gas, which means a lot of noncompetitive structures are sitting out there. And if the $4.50 gas which I quoted in my prepared remarks continues, I think some very important structural changes are going to hit us.

Chairman TAUZIN. Thank you, Mr. Chairman.

The ranking member of our committee Mr. Dingell is recognized for a round of questions.

Mr. DINGELL. Mr. Chairman, thank you.

I would like to welcome you Mr. Greenspan. It is a privilege to have you here before the committee.

Mr. Greenspan's statement has been an excellent one. I have no further comment. Thank you. And welcome, Mr. Greenspan.

Thank you, Mr. Chairman.

Chairman TAUZIN. Thank you, Mr. Dingell.

The Chair recognizes the gentleman Mr. Upton from Michigan, who was first at the committee, for a round of questions.

Mr. UPTON. Thank you, Mr. Chairman. I actually—at meetings like this, I like to ask my question is this the right time to refinance, but I will save that for another day.

Mr. GREENSPAN. If you have a natural gas well, maybe.

Mr. UPTON. I will remind somebody about that in my family.

You know, as I look back at the year 2000 and 2001, coming from Michigan, I thought that one of the very earliest signs about our economy slowing down was the spike that we had in the Midwest with regard to gasoline prices. And it took a number of months to trickle through, but, in fact, we had some real problems, and thank goodness things seem to be back in some balance now. But to me this is another parallel. As you indicated, there are so many industries and home owners that, in fact, went out and converted to natural gas, and as we have seen this price double or triple, there are real problems. As we look at one of the solutions, as we are debating—as we debated an energy bill so to try and open up more lands for domestic production, but I think most people would say that is much more of a long-term solution rather than a short one. And I am just wondering as you talk about creating, in your testimony, a price-pressure safety valve through larger import capacity of LNG need not unduly expose us to potentially unstable sources of imports, how quickly do you think we can do that?

Mr. GREENSPAN. It is obviously not a matter of months. It is going to take time.

Mr. UPTON. Could be another long winter.

Mr. GREENSPAN. It could very well be, largely because there are similarities here to the electric power problems that we had in the past where there is a long lead time when you have a commodity which either has no capacity for inventorying, such as electric power, or limited capacity, which we have for natural gas. That creates a longer timeframe of adjustment usually than we see in many other economic areas.

My own view is that if we can get LNG moving reasonably quickly, and there are an awful lot of potential exporters of LNG—I mean, Russia is clearly looking to get into that market; Indonesia, Algeria, Trinidad—they are all very heavy potential exporters, and there is a potential of this market expanding fairly quickly.

If we have a safety valve in the import area to absorb any imbalance in domestic supply, that gives us the capability of then making other judgments as to what is the tradeoff between the environment and domestic energy production and the like. If we do not have that international safety valve, then we confront some very tight decisions.

And while I acknowledge that there are obvious problems involved when you expand your overall international exposure, at least we know as an ultimate fallback, as we have in oil, we can always get the gas.

Mr. UPTON. Do we have the import structure at our ports to take in imports of that magnitude?

Mr. GREENSPAN. Not yet. As I am sure you know, Congressman, we have four major LNG terminals which are projected to expand, and as I recall, the Energy Information Administration is projecting several new terminals. My own judgment is that we ought to be doing more rather than less in this area. Because the technological advances in LNG have brought the cost down, safety factors have been markedly improved, and I think it gives us the best way that we can handle essentially unforeseen problems in the gas industry. What we do over and above that, I think, clearly is another set of issues.

Mr. UPTON. Thank you.

I yield back, Mr. Chairman.

Chairman TAUZIN. The gentleman yields back.

The Chair recognizes the gentleman Mr. Green from Texas for a round of questions.

Mr. GREEN. Thank you, Mr. Chairman. And thank you, Chairman Greenspan, for being here.

In your comments before the Joint Economic Committee last month and today, you suggested that in the situation that we are now seeing—this long-term trend rather than just short-term spikes that we have grown accustomed to—LNG is a potential, but we also continue to need more exploration both in the continental United States and offshore that would bring supply and demand back into balance; is that correct?

Mr. GREENSPAN. There is no question that from what industry observers have been able to ferret out, there are significant unexploited gas reserves in the lower 48 and obviously up in Alaska as well.

Mr. GREEN. Our energy bill actually provided for that gas pipeline, and I think the Senate's will, too, once they finish their debate. My concern is the consequences, not just the cost of the gas—the natural gas to our consumers, but I have heard that these high natural gas prices are having an effect on possibly shifting our industrial jobs from the United States to countries where the prices are lower, particularly in the chemical area, since gas is feed stock, and even certain Middle Eastern countries. Is this correct? And can you describe that for me?

Mr. GREENSPAN. We are not sure exactly how serious the issue is at the moment because it is unclear at this stage whether a number of the industries, which, as I mentioned before, were largely built on $2 gas, are presuming that the spike or whatever they are looking at now is temporary. And they are making temporary adjustments on the presumption that gas prices will recede very significantly.

If they prove wrong, and it looks as though, as the market is apparently trying to tell us, that there is a far more persistent higher level of prices out there than we are hoping for, then you begin to get permanent changes in structure. You can obviously absorb excess spikes in natural gas prices for a while, and indeed, many have done that over the last number of years. You change the capital structure and the competitiveness of your economy and your production process if a major input cost becomes permanently high-

er than that which you contemplated when the capital investment was made.

And so the answer to the question is we do not see significant shifts as yet, but it is hard to believe that that will not happen if prices stay up.

Mr. GREEN. Okay. From my college economics class, I remember you have to have access to capital, a work force, and also energy to produce. So what you are saying is that any of those three and particularly the cost of energy could make some long-term shifts.

Mr. GREENSPAN. Yes, sir.

Mr. GREEN. Do you know of any actions this Congress or the President could take to increase production in the short term?

Mr. GREENSPAN. No.

Mr. GREEN. Okay. Mr. Chairman, I thank you, and I yield back my time. I wish we had some solutions on the short term. Thank you.

Chairman TAUZIN. The gentleman yields back.

The Chair is pleased to recognize for a round of questions Mr. Whitfield.

Mr. WHITFIELD. Thank you, Mr. Chairman. And like others, I want to extend a welcome to Chairman Greenspan. You have indicated in your testimony and in answering questions that you are uncertain about the impact that the spike in natural gas prices may have had on our economy. Over the last year or so we know from economic data that we have lost a large number of manufacturing jobs in our country. We have had some growth in service sector jobs. But I would ask you what in your view are the primary factors contributing to our loss of manufacturing jobs?

Mr. GREENSPAN. I am sorry, manufacturing jobs you say?

Mr. WHITFIELD. Yes.

Mr. GREENSPAN. The aggregate amount of gross product in manufacturing has drifted only slightly lower relative to the total GDP. So the answer is not a major hollowing out of manufacturing per se, although various measures do suggest that there has been some decline in aggregate output relative to the national product.

What is obviously creating significant decline in jobs is a very dramatic increase in output per hour. The overall productivity growth in the economy as a whole has been very impressive, but "manufacturing" has been especially so. And the arithmetic of maintaining no more than just an average growth rate of aggregate output in manufacturing, coupled with an above average increase in output per hour must of necessity, arithmetically, reduce the proportion of manufacturing jobs to total jobs.

And that is a process which has been going on, as you well know, for quite a while, and there is no immediate evidence of that turning around, so that long term we are getting two things happening: We are getting actually a redefinition of what we mean by manufacturing. Total output of goods per dollar for real dollar value has been going down very dramatically. You know, it was 50 years ago that American manufacturing meant big assembly plants for cars, huge-style complexes turning out vast complexes of heavy-weighted goods. Now the most valuable stuff we turn out of manufacturing is virtually impalpable and very difficult to find. And surely if you

try to weigh it, it doesn't weigh a fraction of what its counterpart weighed 30 to 50 years ago.

Mr. WHITFIELD. You were saying that our productivity has been increasing at such a rate that that has contributed. As I go around in my district and attend town meetings, this issue always comes up about loss of manufacturing jobs which may or may not be real. But many people do have the sense that we are becoming more of a service-oriented society rather than a manufacturing society. If you were trying to give assurances to employees in America, how would you respond to their concern about that?

Mr. GREENSPAN. I think this is a very important question, and I think one that gets raised every 5 or 10 years. And I think that the best way of answering it is to look at our history. This country has grown enormously in the last 100 years, and unemployment rates have on occasion gone up pretty high, but they have always drifted back down to somewhere around 4 or 5 percent of the total labor force, which necessarily means that jobs are created year in and year out. And as those various areas of our economy become obsolescent, new ones come in. And indeed, what tends to happen is that people who are in jobs with no real future or running companies which are in bad shape, they tend to seek different activities and are re-employed.

So overall, we don't know what the job structure will look like 20, 30 years from now. What we do know is that we have every reason to believe that somewhere in the area of 95 percent of our work force is going to be employed as it always has.

Mr. WHITFIELD. Thank you.

Chairman TAUZIN. The gentleman's time has expired.

The Chair recognizes the gentlelady from California Mrs. Capps for a round of questions.

Mrs. CAPPS. Chairman Tauzin, thank you very much. Chairman Greenspan, thank you for your testimony and for being with us at this important hearing today.

My question relates to some of the specific points in your testimony; for example, your statement of a need for increased availability of imports of natural gas and expansion of facilities to handle it, specifically liquid natural gas or LNG facilities. And following along the line of questioning of my colleague, Mr. Upton, there are some inherent costs with this proposal, are there not? For example, the basic costs of liquefaction, transportation, regasification, not to mention the construction of these facilities. And this will raise the cost of imported natural gas versus what we could produce domestically or from Canada. I understand that you have acknowledged that increase. And in addition, I would think we would also want to recognize the safety aspects of these facilities, and especially the security aspects of LNG facilities. If we set down a number of these places, are we not adding yet another potential site ripe for terrorist activities? Lots of questions still remain about how far along we are in securing existing chemical and nuclear plants, and we know that terrorists at least had the drawings of some of our nuclear facilities in mind.

I have a particular concern with these security questions because there are proposals to put an LNG facility right off my district near the fairly large city of Oxnard, which is the gateway to Channel Is-

lands National Park. My concerns are heightened by provisions contained in the House energy bill that would weaken the review process for LNG to facility siting. These provisions essentially give the proponents of LNG facilities an advantage or a leg up in the process. I am concerned that these safety and security questions may not receive the scrutiny they deserve.

Other associated questions such as safety, security, environmental effects impact on fishing, tourism and recreation. I am anticipating the site in one proposal to convert an offshore oil platform into an LNG facility right there at that gateway and the effect that might have on the local fishing industry.

So my question is if you could comment on the associated costs perhaps with this decision whether or not to import natural gas.

Mr. GREENSPAN. Yes. Congresswoman, you are raising a lot of important questions. Let me just say first that we have been fortunate in that the technological advances that have occurred in liquefaction and in transportation and degasifying have been really quite marked, including the storage. This is not a new technology. Remember, we have got a liquefaction plant sitting up in Alaska which I believe has been there since 1969 and indeed is shipping LNG to Japan because that is the only direct route that they can commercially do it at.

If you take a look at the cost and prices coming out of imports in a number of the new LNG importing areas in the Middle East and other areas of the world, prices are not particularly elevated. There is no question, of course, that building these plants and terminals and the like cost money, but the technologies have improved very considerably, and the cost as a consequence has come down. Also, the technology has enabled, in many respects, the safety standards to be significant, we are not dealing with a technology which is dangerous in any meaningful sense of the word, but having said that, as I said before the Joint Economic Committee the other day, there is no way to create energy without any risk. It is a question of choice.

On the issue of environmental questions, as I said before, there is no simple algebraic formula which can tradeoff environment against energy and the economy and other characteristics. We are looking at two really incompatible value systems, and both are crucial to human existence. And the only way to make judgments is for individuals to make those tradeoffs, and indeed, it is those judgments as reflected in the Congress which in a sense makes national policy. But you can't ask an economist, for example, to tradeoff the environment against economic activity because I don't know what the language translation is. In fact, there is none.

Mrs. CAPPS. I know my time is up, but——

Chairman TAUZIN. I have to hold to very strictly; otherwise people are going to miss the chance.

The Chairman of the subcommittee of energy Mr. Barton is recognized.

Mr. BARTON. Thank you, Mr. Chairman.

Chairman Greenspan, you talked about the trends in the natural gas industry in this country in your testimony. You did not—or if you did, I didn't catch it—make a policy statement about whether we should try to be self-sufficient in natural gas production and

consumption. We could do it technically if we wanted to. Should we?

Mr. GREENSPAN. I think not. I think we are committed irrevocably to a global economy and a global environment for a very good reason. You get all of the advantages of the division of labor in a global marketplace, and while we don't put much stress on that in recent years, one of the most important aspects of the flexibility of the American economy which has been so important given the shocks that we have had in recent years, a very considerable part of that flexibility reflects our global status, our ability to interact around the world in so many different areas.

My view is that it is the interest of this country not to endeavor to localize, to be protectionist, to pull in our horns. At the end of the day, I don't think we will succeed. I don't think we have a choice but to deal in a global economy and still have the standards of living that we so much cherish.

Mr. BARTON. Are there—notwithstanding that answer, which is a very good answer, by the way—are there areas in the United States that you think should be drilled for natural gas that are currently off limits because of various political bans?

Mr. GREENSPAN. Well, I am an economist. My view is if you are looking for natural gas, you got to know whether it is there, and the only way to find out ultimately is to drill a hole. And if that drilling of the hole violates environmental standards, those are the tradeoffs that the Congress has got to make.

Mr. BARTON. It is a very political answer from a supposedly nonpolitical appointee.

Mr. GREENSPAN. When you ask a political question, you get a political answer.

Mr. BARTON. All right. Let me ask another nonpolitical question. We had testimony this morning from various individuals who had a preference for a specific pipeline route for the Alaskan natural gas pipeline. Do you have any preference, or do you think that should be a market-based decision, or should it be a political-based decision?

Mr. GREENSPAN. Congressman, if we have got a problem as I try to outline it of the significant possibility of gas prices being higher than we would like, I suggest to you that we allow the market to make judgments as to whether or not we bring gas down from either Alaska or through the MacKenzie River or whatever or whenever.

The reason why I put so much emphasis on LNG is that I think the timeframe involved in any of these pipeline projects is far distant in the future. I know, for example, the Energy Information Administration puts the possibility of the Alaska pipeline at 2021 or something like that. That is pretty far out. And conceivably it could be earlier.

But I think the more important issue is up front we have a far greater capability of significant supplies from LNG than we have from a number of those sources, and my own judgment is that the at the end of the day, those pipelines will be built, and they will be built because the market will be very strongly pressuring that type of construction.

Mr. BARTON. Let me ask my last question in the last 45 seconds. Your testimony has focused, as it was supposed to be focused, on natural gas, but if the goal of a national energy policy is the overall economic viability of our economy, would it not be a positive to enhance the possibility of using other fuel sources like nuclear power and coal to relieve some of the prices on natural gas demand?

Mr. GREENSPAN. I have always testified in favor of reexamining what I think is a policy which is mistaken, namely our views toward nuclear power. I do think that the technologies have improved immensely, and the advantages that they obviously have, I don't have to go into. I am sure you know them far better than I. I do think an overall policy of energy cannot dismiss the issue of nuclear power. You may at the end of the day decide that the desirability of it, granted environmental costs, security and other problems, is such that it is not advisable, but at least look at it rather than dismiss it out of hand.

Mr. BARTON. Thank you, Mr. Chairman.

Mr. GREENSPAN. I say the same for coal.

Chairman TAUZIN. The gentleman Mr. Stupak is recognized for a round of questions.

Mr. STUPAK. Thank you, Mr. Chairman.

Thank you, Mr. Greenspan, for coming here today and testifying.

You have emphasized and you have testified that increased natural gas supply for U.S. consumption will have to come at least in part from increased imports. You have also noted that, and I am looking at page 6 of your testimony, access to world natural gas supplies will require major expansion of LNG terminal import capacity. You go on further to say that as the technology of LNG liquefaction and shipping has improved, and as safety considerations have lessened, a major expansion of U.S. import capability appears to be under way.

In light of the present overall state of the economy, do you have concerns about the availability of capital for investment in these new facilities?

Mr. GREENSPAN. I do not, no.

Mr. STUPAK. How will the present economic downturn then affect this type of investment in the short term, long term? I don't see anyone investing in these terminals if we are going to need them to increase the imports of LNG.

Mr. GREENSPAN. If prices stay anywhere near where they are in the longer-term futures markets, the potential profitability of investments of that type will be far in excess of the normal rate of return on capital investment.

Mr. STUPAK. As you know, we had testimony this morning, we are talking about LNG, and when you take a look at it, we import about 16 percent of our natural gas, 15 percent from Canada and 1 percent from outside North America as liquefied natural gas. So even if we doubled the capacity, that would only be 2 percent that we would be importing. Is the investment worth it to go from 1 percent to 2 percent?

Mr. GREENSPAN. No. I envision a number very significantly higher than that.

Mr. STUPAK. What realistically do you think we could expect from imports?

Mr. GREENSPAN. I don't know. I would just let the market make that determination. I think that as costs go down in the construction of these terminals, and the whole question of safety declines as well, I think the markets will open up in a very significant manner, because remember, it is not only our import capability, it is the availability of LNG in export sites, whether Indonesia or Algeria or Trinidad. I mean, it is the development of a market which is very much smaller than the international oil market. As a consequence its potential for expansion is very substantial.

Mr. STUPAK. So to develop this market it wouldn't necessarily require tax breaks and offsets from the U.S. Government. You feel that the natural gas prices would override any of those conditions for investment?

Mr. GREENSPAN. Implicit in my testimony, Congressman, is that this is not something requiring subsidies. This is something which requires private capital investment. And unless the markets are wrong, and they have been wrong on occasion, and the general view of the long-term equilibrium price for natural gas is where the markets are saying it is, if that stays there for a while, there will be significant capital investment coming specifically in import technologies, especially LNG.

Mr. STUPAK. Well, no matter what industry you look at, whether it's coal, gas, nuclear or anything, in this country when it comes to energy, have not taken a long-term look at our needs. It seems like we try to get through each winter, see where the spikes are, there is some reaction. But I would think if you are going to do the LNG terminals, nuclear, even clean coal technology, whatever it might be, a pipeline even, which might be 2021 before one gets online, we have to take a longer view or longer look at these potential problems on the horizon and not just react every January and February when it spikes. So—and I don't see anyone out there doing the investment that is going to take right now. So how do we get these investments and arrive at a long-term energy policy or goal for this Nation?

Mr. GREENSPAN. I think there are two ways of coming at it. You can subsidize the system, which I think is, one, unnecessary and, two, undesirable; or two, set up a legal structure and a regulatory structure which enables people to invest in a profitable manner, because it is only under those conditions that markets can effectively function and we can resolve problems which are rather difficult. And I don't deny that.

My own view is I trust that what the Congress will do is try to find ways to facilitate capital investment, but not subsidize it.

Chairman TAUZIN. The Chair thanks the gentleman.

The Chair recognizes the Chairman of the Commerce, Trade, Consumer Protection Subcommittee Mr. Stearns for a round of questions.

Mr. STEARNS. Thank you, Mr. Chairman.

Mr. Greenspan, we certainly welcome your comments. Judging from your testimony, what other Members have said, I think in the short term there is probably nothing that Congress could do with less than adequate storage and inability to import sufficient LNG combined with an increase in demand for natural gas. It comes

down to almost Mother Nature, I guess, all of us just praying for a light winter.

But I wanted to follow up on two of your points. One, you talked about the flexibility of the economy, and the other is you talked about a mistake in policy, if I heard you correctly, on nuclear energy. So, I would like to take the latter question first.

I heard you say that this country has a mistake in policy with nuclear energy. And if I heard you correctly, I would like to you elaborate what do you think the United States should do, because the technologies have changed since we have built nuclear, and in many ways that would relieve some of the problem here. So I would appreciate your comments.

Mr. GREENSPAN. I think the policy which I find less than impressive is more neglect than anything. I don't know what the appropriate nuclear policy should be with respect to the whole energy program. It is a very complex set of issues. But the one thing I am reasonably certain of is we are spending very little time relative to the size of the problem in raising the question and examining the question and all the various alternatives as to whether we should be doing more nuclear. The French, for example, have very large nuclear programs and very little problem that I am aware of exists as a consequence of that.

A major endeavor to examine this whole program is where I think we ought to be, and I don't deny at the end of the day that a judgment of the Congress might be that it is not desirable to move forward in this area.

But my own suspicion is that is not the way it will come out, but it is perfectly possible it might.

Mr. STEARNS. So what you are saying is we have no policy now, there is no discussion. You recommend a full-blown nationwide discussion on nuclear energy and what we should do. And you are saying the outcome is in doubt? What we would do as a result of, but you are actually saying that it has been very poor on the United States to turn and put its head in the ground and not look at nuclear energy as an alternative and try to find out what solutions could be done?

Mr. GREENSPAN. Well, I didn't choose those words, but I find myself agreeing.

Mr. STEARNS. Okay. Well, that is good. I told my staff if I could get a no or yes partly, I would be very happy.

Let me just follow up on my other thought I had. In your testimony, you say nearly two-fifths of the world's natural gas reserves are in Russia and its former satellites, and one-third are in the Middle East. Does that include Iraq?

Mr. GREENSPAN. Yes. Although Iraq is not a major natural gas producer. It has got well over 110 billion barrels of crude oil, but not all that much natural gas.

Mr. STEARNS. Why couldn't we say to the industrial plants and the power plants, let us just let the market decide and let the price go up, instead of Congress stepping in? I am just conjecturing this. And the industrial and the power plants will start to get diversity and redundancy, which they should have anyway. And then just take care of the residential, which I think in the big scheme of things, the residential is a lot smaller percentage of everything.

And that is the only way we can get this country to innovate and to come up with solutions.

So I guess my question is, maybe as a follow-up, couldn't we have alternative coal, we mentioned nuclear, hydro for people other than gas, and try to get them to realize that gas is just one commodity and maybe we can go other places.

Mr. GREENSPAN. There is a history of our regulations which most recently goes back to the 1970's when we tried to manage every little nook and cranny in our energy system, and we ended up with long lines at gasoline stations. We have an extraordinary energy economy in this country. If we let it function fully, freely, I think we might find that it is producing a great deal more than it currently is producing.

Mr. STEARNS. Thank you, Mr. Chairman.

Chairman TAUZIN. I thank the gentleman.

The Chair recognizes the gentleman from Louisiana, Mr. John, for a round of questions.

Mr. JOHN. Thank you, Mr. Chairman.

And I too want to congratulate you and to thank you for coming to this very important committee hearing. This issue is very important to me, being from Louisiana, and from an economic standpoint of the district that I represent, about 300 miles of the Louisiana coastline where a major portion of the natural gas in the Gulf of Mexico comes onshore. In fact, Henry Hub is in my district. So it is an issue that I know a little bit about, but I have a couple of questions I would like to ask you. And I guess first, from listening to your answers to some of my colleague's questions and from your concluding remarks as it relates to LNG. You feel that the LNG area could be a possible short and/or long-term solution to some of these problems that we are dealing with relating to price spikes. You state that access to world natural gas supplies will require a major expansion of LNG terminal import capacity—that is in the last paragraph of your remarks. If you believe that, and if that is so, what are the consequences, and are you concerned about America's dependence on another fuel source as it relates to energy stability/energy security as we find ourselves very volatile and vulnerable with the importation of oil?

Mr. GREENSPAN. I think we have to make the choice, Mr. John. The choice basically is whether we want to maintain a standard of living which does require access to international resources both in energy and elsewhere, but carries with it the insecurity risk and various other problems which a number of other of your colleagues have mentioned.

My own judgment is that there is probably no real alternative here but to resort to international sources of energy, because there is no way we can be self-sufficient. We certainly cannot be self-sufficient in oil without changing our lifestyle in ways which I doubt very much whether the American people would coountenance. And it is not quite the same thing with gas, but gas, remember, is currently close to two-thirds the heating value of oil. So it is a rather large industry and has very large ramifications. And so I would say much the same thing about gas as I would about oil.

Mr. JOHN. And I would agree, that the increased activity in the LNG area, with new technology, is certainly a piece of the puzzle

of the portfolio of energy that we must have in this country. I just don't want to see us get ourselves, especially in light of the instability in the Middle East, where I have seen us reliant upon oil imports and where we have been very vulnerable to OPEC and some other sources because it is so important to our economy. I can say with a lot of confidence that home heating and the air conditioning that natural gas produces through electricity is important. But I also have major petro chemical plants up and down the Mississippi River and in Lake Charles, Louisiana that are losing jobs left and right—most recently Koch Energy—because of the price of natural gas. So we are talking jobs that are being lost because of this. Do you think that our domestic natural gas reserves, that we have not been able to access because of some of the decisions that are made up here on the Hill, and I understand they are very political, could meet our demand to prevent the reliance on supply of natural gas from LNG?

Mr. GREENSPAN. Well, let me also just point out, which I tried to do in my prepared remarks, that there is a much greater dispersion of natural gas reserves throughout the world, and hence we are not as subject, or shouldn't be as subject, to the type of problems we have when say three-fifths of our crude oil reserves currently exist in a very small area of the world.

So, I don't deny that there are security problems with natural gas supply, but they are less than for oil, because we have got fairly significant reserves of natural gas in areas which are not serious problems with respect to national security for the United States.

Chairman TAUZIN. The gentleman's time has expired. Mr. Chairman, we are at 3 o'clock. Members are still begging me to have a chance to ask you a question. Would you permit me to recognize a few more members for one question each, or do you have to go?

Mr. GREENSPAN. I think I can do for about 5 to 7 minutes——

Chairman TAUZIN. Let me try to do this.

Mr. GREENSPAN. [continuing] because I have to go to the airport.

Chairman TAUZIN. Mr. Rogers, for one question quickly.

Mr. ROGERS. Thank you, Mr. Chairman, for being here. I just want to follow up in Mr. Whitfield's line of questioning. One of your responses that caught me a little bit off guard, you said, we haven't seen a significant shift in manufacturing, at least offshore. I have to tell you——

Mr. GREENSPAN. I meant by that, permanent shift.

Mr. ROGERS. Well, you said a slight shift, and it was not something we ought to be concerned of. It may be a slight shift if you are an economist in Washington, DC, but if you are a manufacturer in Michigan, this thing is an avalanche. We have lost over 2 million manufacturing jobs. They are citing energy as one of their top concerns, unfair trade, regulatory costs, litigation costs, and tax structure. Not once have they said it is productivity. So maybe you can help me understand this.

Mr. GREENSPAN. Well, all I can say to you is that the data is unequivocal in this regard. I mean, if you look at the arithmetic, the question is, are manufacturing levels of output or value-added eroded only marginally, relative to the total GDP. But the number of jobs have gone down very dramatically, and it means that you can produce a higher level of output with fewer people. That is

what the numbers tell us, and I have every reason to believe that they are accurately reported.

Chairman TAUZIN. Thank the gentleman.

Mr. Markey, for one short question.

Mr. MARKEY. Mr. Chairman, most natural gas is used for home heating, and most houses are purchased with mortgages. And Freddie Mac and Fannie Mae are the companies that are used to do most of that mortgaging. My question to you is—that is a loose nexus, but I am trying——

Mr. GREENSPAN. I know where you are heading, Congressman.

Mr. MARKEY. [continuing] There is a wave of accounting scandals now hitting Freddie Mac, and they are exempt from having to register their securities with the Securities and Exchange Commission. In your opinion, is it wise for that exemption to be allowed to continue, or would we be better to have both of those companies have to register their securities at the Securities and Exchange Commission, like every other in the United States?

Mr. GREENSPAN. I believe in past questions, I have agreed with your general point of view on that. In other words, there is no reason to differentiate Fannie and Freddie from the rest of the securities industry, as far as I am concerned.

Mr. MARKEY. Thank you, Mr. Chairman.

Chairman TAUZIN. Mr. Otter, for a short question, quickly.

Mr. OTTER. Thank you, Mr. Chairman.

I had quite a few questions here, Mr. Chairman, but I am going to narrow it down to one, and relative to a statement that you made that markets decide. And it has been my short experience since I have been in Washington, DC. That it seems to me like the government decides. We say we want conservation, yet we go out and we heard testimony this morning from the gentleman from PUC in Ohio saying we had to have more government programs that paid people during the winter months when their heat bill goes up. So when we end up subsidizing consumption, then there is no market demand. There is no high price for people to conserve. Yet, we know that the lowest hanging fruit in the energy orchard is conservation. So, tell us how we can adjust those two positions of our willingness to start programs that pay people to consume, yet we also try to have programs that say please consume.

Mr. GREENSPAN. I agree with you. There is a contradiction that has to be resolved.

Mr. OTTER. Well, that was quick. Could I have another one?

Chairman TAUZIN. No, you had it. Mr. Allen, for a short question.

Mr. ALLEN. Mr. Chairman, Chairman Greenspan, thank you for being here. I will be quick. U.S. oil production peaked sometime ago, around 1970. I am struck by looking at the numbers in some of the charts. We have been presented with the fact that it looks to me like the projections for domestic natural gas production are very flat. You know, you can add on Alaska, but otherwise they look flat. And you testified that it is harder and harder to get natural gas out of certain sources here. Are you at all concerned that there is the possibility that the peak production for natural gas in the United States may come in the next decade or two?

Mr. GREENSPAN. This is a very big issue amongst geologists. And the conventional gas probably creates concern. But there is a general presumption that the nonconventional gas, the tight sands gas, the coal bed methane and shale all have significant possibilities for much greater expansion than we currently contemplate. And the reserves, the so-called nonproved reserves, expected geological formations and the like, suggest significant possibilities there. But I do think that we had this debate, I remember, on oil and it was exactly the same. In other words, we were sitting there with crude oil production in the United States continuing to rise, and there were those who were saying that the peak is near and those who were saying that it is five decades off. I don't think we really know. But I do know that there is a big debate going on, and it is an issue which is obviously crucial. The reason I say that the LNG is important is it will help either way, if I may put it that way.

Chairman TAUZIN. The last question, Mr. Bilirakis, and then we will wrap up.

Mr. BILIRAKIS. Thank you, Mr. Chairman.

Mr. Chairman, in the interest of time. I studied petroleum engineering, got a degree in it many years ago. We had a thing in the law at that time called the oil depletion allowance, and then it went by the wayside. I have been here for 21 years, and I don't think anybody has ever brought it up. But we can talk about the problems being this and that, that sort of thing. I think we are just short in production. We don't have the incentives, et cetera, et cetera. That is my opinion. But I would ask you, should we consider bringing back some form of an oil depletion allowance, something to encourage, if you will, better, more production?

Mr. GREENSPAN. Well, I am not sure that we need incentives in the sense that, at the prices that currently exist, profitability and exploration and development within the United States, especially in the Gulf and offshore, are more than adequate, in my judgment, to maintain levels of production to the extent that we can. Remember, that we are dealing with 48 States and the Gulf of Mexico which has been plugged full of holes. And you would know, certainly far better than I. And there is a law of diminishing returns that we are not getting. I mean, you can stamp hard in some places of the Middle East and you get a gusher. Here, it requires some very sophisticated technology to find new reservoirs of oil.

Chairman TAUZIN. Thank you, Mr. Chairman. The committee is in your debt again for the service you provide the country, and we appreciate your testimony, sir.

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

Chairman TAUZIN. The committee stands adjourned.

[Whereupon, at 3:10 p.m., the committee was adjourned.]

[Additional material submitted for the record follows:]

PREPARED STATEMENT OF THE EDISON ELECTRIC INSTITUTE

The Edison Electric Institute (EEI) and its Alliance of Energy Suppliers (Alliance) are pleased to submit this statement for the record of the Committee's June 10 hearing on "Natural Gas Supply and Demand Issues." EEI is the trade association of the U.S. shareholder-owned electric utilities and affiliates and associates worldwide. The Alliance is a Division of EEI that focuses on the generation business and related wholesale business issues in the supply of electricity.

Record natural gas prices have gotten everyone's attention, from the homeowner who uses natural gas for heat to the electricity generator whose operating costs are

substantially influenced by the cost of natural gas. Because generators of electricity are an important and increasingly significant end-user of the nation's natural gas supplies, EEI appreciates the opportunity to submit written testimony, and to address the concern that this sector has with the current and foreseeable imbalance between demand and supply.

While we believe there are limited opportunities in the short term for reducing demand in our sector—primarily by encouraging large industrial users to switch to off-peak times of consumption—there are longer term solutions for assuring adequate natural gas supplies in this country. These include helpful conservation and careful policies to identify, tap and bring to market available known reserves and new reserves—both here and abroad. It is the combination of increased supply and the efficient use of that resource that will—result in lower—natural gas prices.

But from the perspective of the electric power industry, which is searching for ways to continue the production of low-cost electricity essential for the United States to compete in a global economy, one of the most important long term solutions is for Congress and the President to make sure that federal policies assure that an adequate and diverse fuel supply is available for the generation of electricity. Fuel diversity means that coal, nuclear, hydro, wind, solar, natural gas—and other fuel sources as they become available—can continue to be used by generators of electricity to mitigate price or supply risk in any one source. It also means "fuel switching" or maintaining a "dual fuel capability," where natural gas-fired plants are constructed and permitted to allow a switch between natural gas and oil products in times of either high prices or limited natural gas supplies.

Policies advanced by the Congress and the Administration need to maximize the diversity of fuel sources available for the generation of electricity while allowing market forces to dictate the choice, in any given circumstance, of how to assure the low-cost production of electricity. Fuel diversity needs to include the ability to move large blocks of power between regions so that diverse electric supplies can move into various regions. For example, the potential of wind development throughout The Great Plains is limited by a lack of high-voltage transmission lines to carry the abundant raw resource to markets, either East or West. A more robust transmission system would permit more inter-regional powerflows, which might permit coal, nuclear, hydroelectric and renewable technologies to penetrate markets displacing other fuels.

Of course, stimulation of investment in transmission will do little to help if permitting of new transmission lines continues to take more than a decade. As to improving transmission siting, EEI compliments the Committee on its decision to include in H.R. 6 provisions to establish the Department of Energy (DOE) with lead agency authority to coordinate the federal authorization process for transmission lines, including project specific coordination requirements, and to give last-resort backstop siting authority to FERC. Together with the corridor designation provisions of the bill, these new provisions will introduce transparency into the permitting process and facilitate timely decisions. We strongly urge the Committee to fight for these provisions when H.R. 6 is conferenced with the Senate energy bill.

As transmission is helpful in distributing electricity, a market basket of generating technologies (coal, nuclear, hydroelectric and renewables as well as natural gas) is helpful to fuel diversity and price stability. The price of converting different fuels to electricity varies by technology, but generally, the broader the selection of technologies and fuels available to the generator, the better for all classes of customer. When hydro generating capacity is reduced by a non-functional and prolonged hydro licensing process and federal policies render coal generation less economical, the short fall in generating capacity must be made up elsewhere. Carefully established hydro and coal policies that allow these fuel sources to continue to play a serious role in the nation's fuel mix will help alleviate pressure on natural gas supply.

The current Clean Air Act's complex and multiple, overlapping requirements for electric power generators constrain the use of coal generation. This puts additional pressure on using natural gas to generate electricity. The Clear Skies Act (H.R. 999) would reduce such pressures on natural gas by providing certainty to coal generators, while achieving roughly 70 percent emission reductions in sulfur dioxide, nitrogen oxides and mercury emissions over a timeframe that would promote immediate environmental improvements and industry stability through certain and cost-effective emissions reductions. By contrast, the Clean Power Act (H.R. 2042) would exacerbate natural gas cost and supply concerns.

Congress should be concerned that federal energy, environmental and economic policies do not: (1) inadvertently create an economic climate wherein one fuel, such as natural gas, becomes the only practical option for new generation (2) in effect

preclude the use of certain abundant and low-cost fuels or (3) sharply limit the generators flexibility to select a fuel mix that can optimize the production of electricity.

Electricity is the backbone of the modern economy. Advancements in technology have increased U.S. productivity and driven growth, but technology depends on ever increasing amounts of electricity. Currently, coal generation provides 50.1% of the nation's electricity supply, nuclear generation provides 20.3%, natural gas provides 18.1%, hydropower and other renewables provide 9.1%, and oil generation provides 2.4%.

In the past 10 years, natural gas-fired generation has been critical to providing the low-cost electricity that is crucial to assuring that the United States can compete in the global economy. Natural gas has become the fuel of choice for new power plants because plants fueled by natural gas are highly efficient, have predictable and short construction cycles, and lower emissions. The trend was aided by the historically low cost of natural gas and the pressures on the costs of the other traditional sources of fuel for generating electricity.

While natural gas-only-fired power plants account for 18% of the fuel used by all generation nationwide, 88% of the new electric capacity built in the last 10 years use natural gas as their primary, and in many cases only, fuel. Numbers of this magnitude indicate that the percentage of natural gas used as fuel for electric generation will most likely increase. There are good reasons for this.

First, power plants fired by natural gas have become very efficient. Combustion turbines fueled by natural gas (simple cycle) were originally designed to augment large baseload producers of electricity (coal, nuclear, and hydroelectricity). They were designed to run for brief periods of time or a few hours annually to help meet peaking requirements. By being smaller and specialized, the combustion turbine minimized capital costs of construction and could be quickly installed. This was especially desirable when the nation had excess baseload supply and when cost overruns were common in the construction of baseload units, particularly for nuclear projects.

The advent of higher efficiency combustion turbines in the 1990's further accelerated the role played by natural gas-fired power plants in the nation's generation mix. The "Heat Recovery Steam Generator," where waste heat from a combustion turbine is used to produce steam and turn a steam turbine—hence the term "combined cycle"—created efficiencies greater than 50% per each BTU of energy combusted. This compares to efficiency rates of 35-40% for coal plants. Highly efficient combined cycle plants in 2003 now have an efficiency rate over 55%. Thus, some are now being used for baseload operations, rather than just for peaking or load-following. Second, the construction lead-times for natural gas-fired generation are shorter than those for coal and nuclear. This benefits owners and developers by limiting the exposure of capital because there is a shorter period when costs are being incurred but no electricity is being sold.

Third, construction costs for gas-fired generation are easier to estimate and much less likely to be subject to construction cost over-runs than other types of power plants. This makes it easier for owners and investors to take the risk of investing millions of dollars in a new power plant.

Fourth, it is much easier to get environmental permits for natural gas power plants because of their lower emissions profile relative to more traditional coal or oil units.

Fifth, natural gas has traditionally been a relatively cheap fuel source.

Sixth, natural gas-fired units can often be sited to optimize location on both the natural gas transmission system and the high-voltage electric transmission system.

Finally, for the electric system, one crucial advantage of natural gas technology is its quick start capability and ability to move from zero output in a combustion turbine, to full power in less than an hour. A combined cycle takes longer because of the longer time required to receive power out of the heat recovery steam generator. This ability to easily load follow is very helpful in an industry which constantly rebalances between supply and demand for voltage control purposes.

We recognize that this presents challenges, however, to the natural gas transmission industry and, if un-coordinated with pipeline dispatch operations, can create operational difficulties. The amount of gas demanded by a combustion turbine going to full power or shutting down rapidly because of fall-off in electricity demand can create imbalances in the pipeline system and natural gas storage and even liquefied natural gas (LNG) helps in managing operational requirements of gas-fired generation. Further development of storage facilities throughout the natural gas market area, including LNG facilities, will be crucial to the balancing of gas supply and demand, as well as to electric operations.

In some regions of the country, dependence on natural gas is pronounced. For example, in the gas-producing Southwest, some utilities came to rely on natural gas

as a boiler fuel for electric production when other market uses for natural gas were not well developed. Because they were using boilers to generate electricity, they could switch fuels from natural gas to various grades of oil for either price or supply reasons. Some of these units are now being retired, further reducing the fuel flexibility of the electric industry. Only 24% of the 168,760 MW of gas-fired generation in operation since 1993 have dual fuel capability, and that percentage is declining. According to the RDI's PowerDat data base, by 2011, only 7% of the 188,215MW of new natural gas capacity planned is identified to have dual fuel capability, which represents 71% of total new electric generation. While some power plants can burn oil in addition to natural gas, there are three main impediments to actually making the switch to oil. The physical impacts on the combustion turbine, such as increased maintenance requirements and possible warranty limitations from the turbine manufacturer, discourage switching to oil Additionally, environmental permits may preclude the use of oil because of increased NO_X emissions associated with the use of distillate oil (FO2). Finally, many local zoning regulations do not allow the construction of oil storage tanks.

All of these factors associated with the lack of fuel switching capability contribute to increased inflexible demand by the electric industry for natural gas for electric production, which, in turn, can contribute to increased natural gas commodity prices and increased levels of price volatility.

The nation benefits from robust and diverse natural gas supplies. The Congress, the Administration and the Federal Energy Regulatory Commission should publicly encourage the development of new production, new pipeline capacity and market-area storage to assist in meeting the demand of the electricity producer and other end users for natural gas.

There may be those who would advocate end-use restraints on natural gas. EEI firmly believes that these are not an appropriate solution to resolving natural gas supply and demand problems. The market has the ability to ration supply, and over time will return to equilibrium. The market needs to be allowed to send price signals that will stimulate investment in alternative generating technologies, dual-fuel opportunities, and development of new gas supplies. End-use restraints, even if applied prospectively, have the potential to create considerable economic inefficiency and would be counterproductive.

In conclusion, the use of natural gas to create electricity has been good for consumers and should remain an accessible fuel source for electric generators. There are strong economic, efficiency, and environmental reasons to use natural gas in the generation of electricity. Even if, as a nation, we transition to greater reliance on renewable resources, natural gas will continue to be a necessary backstop. It is therefore essential that we take the steps that are necessary to assure an adequate supply. It is also crucial, however, that Congress and the President provide greater regulatory certainty to the generators of electricity—particularly as to the environmental standards that new and existing generating sources of all types will have to meet—and that the permitting and siting processes be streamlined to reduce the current long-lead times.

PREPARED STATEMENT OF THE INTERSTATE NATURAL GAS ASSOCIATION OF AMERICA

INTRODUCTION

The Interstate Natural Gas Association of America ("INGAA") represents North America's interstate and interprovincial natural gas pipeline companies. INGAA's members build and operate natural gas transmission pipelines and provide pipeline transportation services for third parties. These activities are regulated by the Federal Energy Regulatory Commission ("FERC") in the United States and by the National Energy Board in Canada.

For over a decade, interstate pipelines have operated purely as non-discriminatory, open access transporters of natural gas on behalf of third party shippers and have not been in the business of purchasing and reselling natural gas. This development followed the wellhead decontrol of natural gas by the Congress and the competitive restructuring of the natural gas industry by the FERC (and similar deregulation and restructuring in Canada). While interstate pipelines, in some cases, are affiliated with producers, marketers and distributors of natural gas, the natural gas industry generally is vertically disaggregated, with separate production, transportation and distribution segments.

Natural gas consumption in the United States has grown steadily over the past decade as our nation's economy has grown and as this fuel has been valued for its reliability, affordability and environmental attributes. The interstate pipeline indus-

try has added greatly to North America's transmission pipeline infrastructure to facilitate the delivery of increased supplies of natural gas from producers to growing consumer markets. The Energy Information Administration ("EIA") projects that natural gas demand will continue increasing dramatically over the next 15 years. This will occur, however, only if natural gas supply and pipeline capacity can keep pace with demand, thereby keeping prices within a reasonable range.

THE CURRENT SITUATION

Competition and restructuring increased the efficiency of the natural gas industry and brought close to 20 years of moderate prices for natural gas delivered to local distribution companies and direct end-use consumers. Now, however, a confluence of factors has resulted in a much tighter balance between natural gas supply and demand and, as an inevitable consequence, higher natural gas prices and greater price volatility. These factors, which have been documented in greater detail elsewhere, include: the end of the excess natural gas production capacity that characterized the industry from the early 1980s through the late 1990s (the "gas bubble"); significant growth in the demand for natural gas, particularly for new electric generators; the decline in drilling activity following the collapse of natural gas prices in 2002; accelerated decline rates for production from natural gas wells as a result of the combination of improved technology and the diminished quality of *accessible* drilling prospects; and a hot summer in 2002 followed by, in some parts of the country, a cold winter in 2002-2003, which resulted in significantly depleted natural gas storage entering the spring and summer of 2003.

It is likely that that the balance between natural gas supply and demand will remain tight for the next several years before significant new natural gas resources can be brought to the market. There will be pressure on elected officials and regulators for action to shield consumers and industry from the effects of higher natural gas prices and greater price volatility. While there may be certain constructive steps that can be taken in this regard, it will be important to resist government interventions in the marketplace that will be counterproductive to an efficient, long-term solution to the supply problem.

Experience demonstrates that markets are superior to government at allocating resources. Government intervention in the market can lead to rationing and price regulation. Prices play a critical role in providing incentives for developing new resources, infrastructure and technology and in causing consumers to make efficient choices between fuels and between consumption and energy efficiency. The best energy policy is one that, first, promotes rational economic decisions about consumers' choices in fuels and technologies and that, second, removes artificial barriers to developing energy resources in an environmentally responsible manner.

With this as background, INGAA offers its comments on several near-term and long-term issues that have garnered attention in connection with the focus on natural gas supply and demand:

Natural Gas Storage

The rate at which natural gas storage is being refilled in advance of the next winter heating season has received great attention recently. In connection with this, it is useful to review the roles of the respective industry segments in refilling storage and the limitations on how quickly storage can be refilled.

As an integral part of their transmission systems, interstate natural gas pipelines own and operate a majority of the natural gas storage capacity in the United States. Still, as a result of natural gas industry restructuring and FERC's open access policies, it is the pipelines' customers who own the natural gas in storage and who dictate the injection and withdrawal of natural gas from storage. Such customers' ability to inject and withdraw gas from storage, however, is dictated by the availability of sufficient interstate pipeline capacity. This could be an important factor should this year's storage refill continue to lag historic rates. That is, unless storage customers have reserved firm pipeline capacity at levels sufficient to complete their storage refills, they could find themselves competing with customers seeking to use pipeline capacity for other purposes, such as fueling electric generators in response to summer peak demand.

Interstate Pipeline Construction

Interstate natural gas pipelines are not constructed on speculation. Rather, given the significant market and development risks for new pipelines, pipeline companies will not invest the huge capital required for a new pipeline unless the investment is underwritten by long-term contracts with creditworthy shippers. In recent years, transportation contracts with natural gas merchants and with electric generators supported much of the new interstate pipeline construction. Therefore, it is not sur-

prising that the overall slowdown in the nation's economy and, in particular, the severe economic distress in the merchant energy and non-utility generation sectors of the energy industry has caused a corresponding slowdown in the expansion of interstate pipeline capacity.[1]

Historically, natural gas producers, and especially small independent producers, have been reluctant to sign firm contracts and undertake the long-term financial commitment associated with new pipeline capacity. Still, there are signs that this is changing. The $1 billion Kern River Gas Transmission Company expansion—which extends from Opal (in southwest Wyoming) to southern California and southern Nevada—entered service in May. This project, which is fully underwritten with firm contracts, doubled the capacity of the Kern River pipeline and provides a means for additional Rocky Mountain natural gas production to reach markets. In addition, El Paso Natural Gas recently announced plans to proceed with its Cheyenne Plains project which will transport Rocky Mountain production from the Cheyenne hub in Wyoming to interconnections with pipelines in the Midwest. This project is supported primarily by contracts with Wyoming producers.

Even if the expansion of interstate pipeline capacity is retarded temporarily, the long-term trends point to the need for significant new pipeline capacity to keep pace with growth and to connect new supply sources. The INGAA Foundation has estimated that between $60 and $70 billion in new pipeline investment will be required over the next 12 to 15 years in order to meet the demands of the market.[2] A financially sound pipeline industry and a supportive public policy and regulatory environment will be necessary for such capital formation to occur efficiently.

Capital formation remains the "coin of the realm" for getting new pipeline projects off the ground, and the current trend is not encouraging. This is illustrated by the fact that capital investment in the previously-mentioned Kern River expansion equaled the value in total of the eight largest transmission expansions completed in 2002. While part of the answer here lies in commitments from creditworthy shippers willing to subscribe firm transportation capacity, the ability to attract capital to the pipeline sector would be improved by removing the impediment to capital formation created by the Public Utility Holding Company Act ("PUHCA"). The Act currently serves as a barrier for some investors who might otherwise be able to provide capital for the natural gas industry, by potentially making then subject to PUHCA's restrictive provisions. In the 21st century, the need for this statute no longer exists, and therefore INGAA strongly advocates PUHCA repeal. Any purpose served by keeping this anachronistic statute on the books is overwhelmed by the harm it causes in limiting investment in the regulated energy sector.

It also is important to understand how pipeline construction opponents are exploiting conflicts between existing laws and overlapping jurisdictions to delay and, in some cases, possibly defeat pipeline projects. For example, the Coastal Zone Management Act ("CZMA") has been invoked by two states to block interstate pipeline projects for which the FERC already has issued a certificate of public convenience and necessity; and, in one of these cases, this effort has been abetted by the National Oceanic and Atmospheric Administration within the Department of Commerce engaging in a protracted review of the appeal from the state's action. In other words, a federal law is being used by individual states to block the construction of federally authorized, interstate projects that are important to meeting the energy needs of the nation at large.

Also, with the likelihood that we will be increasingly reliant on natural gas resources developed on federal lands, such as in the Rocky Mountain States, it is important to address the process for siting and permitting interstate pipelines on federal land. The FERC needs a clear mandate for facilitating greater cooperation between government agencies. While the FERC has the primary responsibility under the Natural Gas Act for approving interstate pipeline construction, it defers to federal and state agencies on environmental and land use permitting. Often these other agencies operate at cross purposes, resulting in a cumbersome and time consuming process for the applicant pipeline.

A few months ago, FERC signed a memorandum of understanding with nine other federal agencies with the goal of making the permitting process less onerous for pipelines. The signatories to this MOU agreed to review pipeline construction permits concurrently, rather than serially. This is a positive step and the various agencies should be held to their commitment. Avenues for engaging state agencies in such commitments also should be explored.

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[1] See: *Expansion and Change on the U.S. Natural Gas Pipeline Network—2002*; Energy Information Administration, May 2003.

[2] *Pipeline and Storage Infrastructure for a 30 TCF Market—An Updated Assessment*; The INGAA Foundation, January 2002.

Finally, economic regulation should not blunt the price signals that provide the incentive for customers and the industry to commit to new pipelines, storage and powerplants. While it is understandable that elected officials and regulators want to respond forcefully to alleged misconduct in California and the Western states, it is important that they not dampen the role that scarcity and price play in signaling the need for new energy investment that can restore the balance between supply and demand and thereby produce reasonable prices for consumers. A shift toward a policy that just and reasonable prices must be the lower of cost or market would greatly increase the perceived regulatory risk associated with investment in regulated U.S. natural gas and electric power markets and would sow the seeds for future shortages and price volatility.[3]

Gas-Fired Electricity Generation

Some have expressed concerns that the electric power industry is becoming overly dependent on natural gas and that this fuel should be preserved for so-called "high value" uses, *i.e.,* space heating and industrial process uses.

This sentiment sounds remarkably like the arguments made during the artificial shortages of the 1970s that resulted from wellhead price controls and the bifurcation of the interstate and intrastate natural gas markets. The mistaken perception that the nation was running out of natural gas and the resulting policy decision to husband this resource for "high value" uses led to enactment of the Powerplant and Industrial Fuel Use Act of 1978 and other initiatives to affect fuel choice through government market intervention. The Fuel Use Act was repealed by the Congress a decade later to end the distortions it was causing in energy markets. The legacy of this 1970s energy policy should teach us a lesson about the adverse consequences of substituting government intervention for market economics in choosing fuels and electric generating technologies.

Natural gas has been the fuel of choice for new electric generators because gas-fired turbines offer advantages over other technologies in terms of capital cost, siting and environmental permitting, modularity and speed of installation. If there is a legitimate public policy concern that the current regulatory and market environment skews the choice of generating technology to favor natural gas, the appropriate answer is not to impose artificial limits on the deployment of gas-fired technologies, but rather to remove unnecessary impediments to other generating technologies. Does the regulatory process for siting, permitting and constructing generators create a bias against other generating technologies? Do the structure and rules governing wholesale electricity markets create a bias? If so, the most appropriate public policy would be one that removes such bias. (This would have to be done carefully, however. Past attempts at overtly favoring particular generating technologies produced unintended, adverse results.)

In addition, in considering whether there is a looming overdependence on natural gas for electric generation, it is important to place the question in its proper perspective. Clearly, most of the recent additions to power generation are natural-gas-fired. During the period from 1999 to 2002, about 144 gigawatts of new generation was added to the grid, of which 138 gigawatts (96 percent) is natural-gas-fired. Still, natural gas generators are intended primarily to supply peak and intermediate capacity, not baseload. Coal continues to dominate baseload generation, and still commands 52 percent of all electric generation. EIA expects that the total amount of electric generation from coal only will decrease to 47 percent by 2025, despite the rise of gas-fired generation.

Natural gas' share of electricity generation now is at 17 percent, and is expected to grow to 29 percent by 2025, according to EIA. Nuclear generation is expected to remain flat over the next 20 years, with the result being an overall decrease in nuclear power's share of power generation. Natural gas is expected to overtake nuclear power as the nation's second-largest source of electricity by 2006. In sum, while dependence on natural gas for electricity generation will grow over the next two decades, the U.S. electric power industry will continue to have a diverse and balanced generation portfolio.

The Natural Gas Resource Base

In responding to suggestions that natural gas be conserved for "high value" uses, it is important that we not fall into the trap of addressing this issue with a scarcity mentality. While the balance between supply and demand in natural gas markets has tightened considerably, there clearly is a natural gas resource base in North America that can support expanding natural gas markets.

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[3] See: *Price Revision in Western Energy Markets: What Standard for Market Intervention;* Cambridge Energy Research Associates, Inc., May 2003.

The National Petroleum Council in its 1999 study estimated that the natural gas resource base in the lower-48 states is nearly 1500 trillion cubic feet (tcf). In addition, the NPC estimated Canada's resource base at nearly 700 tcf. To place these numbers in perspective, the United States will consume approximately 23 tcf of natural gas this year.

The challenge is whether we can develop this resource base and the associated infrastructure at the pace needed to keep up with demand. In responding to this challenge, the natural gas industry is seriously handicapped by current public policy, which reflects a choice *not* to develop much of the country's natural resource base. By some estimates, 30 to 40 percent of our country's potential natural gas resource base is either off limits or else is open to development under highly restricted conditions. The question for policy makers is whether we as a nation can afford policies that leave vast amounts of our domestic natural gas reserves untested and undeveloped. Until recently, the long-lived excess of natural gas production capacity masked the true cost of such policies and permitted elected officials and their appointees to make politically popular decisions that energy resource and infrastructure development would not occur "in my backyard" or "off my beach." Those days are over, and we now must be assessing and developing a variety of new natural gas supply options, rather than hoping that all of our supply needs can be met by incremental additions to already-developed resources.

There is no silver bullet response to the need to replace current natural gas production and to add incremental production to meet the increasing demand for natural gas. It will take the development of resources and infrastructure from multiple locations, including the Rocky Mountains, the Deepwater Gulf of Mexico, arctic frontier regions in Canada, the Alaska North Slope and imported liquefied natural gas ("LNG"). All of these options are possible, and affordable, if only policy makers respond favorably on the fundamental, threshold questions on developing the nation's natural gas resource and infrastructure base. Furthermore, all of these options *are needed* collectively for meeting the demand for natural gas in the coming decades.

One of those critical resource basins is the North Slope of Alaska, which gives rise to the need for new pipeline infrastructure to deliver North Slope natural gas to the Lower 48 states. While an Alaska natural gas pipeline was first authorized by the Congress more than 25 years, the need for these natural gas resources and the infrastructure for delivering this gas to American consumers has never been greater. While the United States cannot pin its hopes solely on Alaska gas, neither can it realistically hope to meet projected demand without it. INGAA hopes that comprehensive energy legislation will include the necessary provisions ensuring that this pipeline becomes a reality.

One Final, Cautionary Note

One of the most important provisions of the Pipeline Safety Improvement Act of 2002 is the mandate for "integrity assessments" for natural gas systems in populated areas. This new law establishes strict timeframes for baseline integrity assessments and re-assessment intervals. Beginning this year and continuing throughout the decade, significant pipeline segments will be removed from service in order to perform assessments and any resulting repairs. Furthermore, because this will be occurring in a competitive industry, pipeline operators may not coordinate the scheduling of their assessment activities, due to anti-trust concerns.

This unprecedented integrity program will almost certainly affect natural gas deliverability and delivered natural gas prices. This effect could be compounded by the fact that, coincidentally, the integrity assessments will be occurring during a period of tight natural gas supplies. In view of this, the details of the rulemaking implementing the pipeline safety legislation that is currently pending before the Research and Special Programs Administration ("RSPA") of the Department of Transportation could have a significant effect on just how severely compliance with the integrity management program will affect natural gas deliverability. This is an important factor to bear in mind as the Congress performs oversight of RSPA's rulemaking.

RESPONSE FOR THE RECORD OF HON. ALAN GREENSPAN TO QUESTIONS OF HON. RICHARD BURR

Question 1. In your estimation, what is the best approach for our nation's energy policy to establish the North Slope pipeline project? Purely market driven? Subsidization through tax incentives and loan subsidies? Loan subsidies alone?

Response: If, as I outlined in my statement, our nation has a problem of the significant possibility that gas prices remain higher than we would like, I suggest that we allow the market to make judgments as to whether or not we bring gas to the

lower 48 states from either Alaska, through the MacKenzie River, or by some other means. Investment in these pipelines is not something requiring subsidies; construction of these pipelines requires private capital investment that will be supplied in response to the market's signals of the need for their construction.

Question 2. Would subsidizing the project through tax incentives as proposed in the other Chamber's legislation create a tax revenue drain?

Response: The subsidies would lower tax revenues generated from the operation of the pipelines.

Question 3. What are the factors inhibiting investment in new baseload coal and nuclear capacity? What policy options are available to the federal government to stimulate investment in these electric generation technologies that could relieve the stress on natural gas markets?

Response: Analysts cite an uncertain regulatory environment as well as uncertain future environmental standards among the factors inhibiting additional investment in nuclear energy and coal in the power sector. In the absence of a resolution of these regulatory issues, it is difficult for anyone to determine whether the economics would justify additional investment, at least in increasing nuclear capacity. It appears to me that we are spending very little time relative to the size of the problem in raising and examining the question whether there should be additional investment to create power generating capacity using more nuclear energy and coal. Congress needs to make a judgment of the future course of our national policy toward nuclear energy. If we wish to augment our electric generation capability through greater use of coal and nuclear energy, we need a stable legal and regulatory structure which enables people to invest in a profitable manner, should the economics justify such investment, rather than attempting to accomplish this goal through various types of subsidies.

PUBLIC UTILITIES COMMISSION OF OHIO
July 2, 2003

The Honorable W.J. "BILLY" TAUZIN,
Chairman
U. S. House of Representatives
Committee on Energy and Commerce
Washington, DC 20515-6115

DEAR CHAIRMAN TAUZIN: I am writing in response to questions posed by Congresswoman Hilda Solis, and would like to thank her for her interest. Conservation and energy efficiency are key as we strive to control costs on our heating and cooling bills. Setting back your thermostats, checking your insulation and having your heating and cooling systems checked and possibly tuned up are a few ways to lower your natural gas usage. Attached, you will find a graph which shows the results of a survey conducted by a local distribution company of residential customers in Ohio and Maryland, which is a breakdown of energy efficiencies and conservation measures. Additionally, I have attached information collected by the Department of Energy/Energy Information Administration, which shows Natural Gas Consumption by Sector and Proportion of Natural Gas Consumption in Residential and Commercial Sectors by State.

I believe that when looking at natural gas consumption it is important to note that residential customers only account for 25% of usage. Therefore, a 5% reduction in residential usage only reduces consumption by about 1%. In conclusion, the only way that prices will drop is if commercial, industrial and generation demand is reduced. Electricity generation demand is largely a function of weather, heat in the west and cold in the east. Furthermore, industrial demand is a function of economic growth.

Congresswoman Solis also requested information on incentive programs that exist in Ohio to encourage energy efficiency, and we are unaware of any such programs that exist, which have contributed to the reduction of natural gas consumption. The energy efficiency programs that do exist in Ohio are funded by other means.

I hope this information is helpful and provides a better understanding of the impacts on natural gas prices. Thank you for giving me the opportunity to testify and respond to questions of the Committee.

Sincerely,

DONALD L. MASON, *Commissioner*
Public Utilities Commission of Ohio

RESPONSE OF JEFFREY R. CURRIE, PHD., MANAGING DIRECTOR, GOLDMAN, SACHS & CO., TO QUESTION OF HON. HILDA L. SOLIS

Your analysis shows that price fluctuations are caused more by lack of transportation and storage infrastructure, rather than lack of supply. You further note that profits from drilling for gas are much greater than profits for creating infrastructure. Doesn't this suggest that the repeated calls to open up federal lands to drilling is more profit driven than motivated by interest in stabilizing prices?

Although the upstream or drilling part of the energy industry generated better returns on assets during the late 1990s than the downstream or infrastructure part of the industry, what is more important is that the entire energy sector, including the upstream part of the industry underperformed the broader market. More specifically, during the 1990s the upstream part of the industry had an 8.7% cash return on cash invested versus an average market return on cash invested of 12.5% for companies in the S&P 500. Further, it is reasonably assumed by most estimates that the cost of capital during that same time period was between 10-15%. The reality of modern capital markets is that only industries with significant positive returns on cash invested above the cost of capital attract new capital. Over the last decade, the upstream part of the energy industry did not meet this requirement. As a result, it is extremely unlikely that excess returns have motivated the "repeated calls to open up federal lands to drilling."

The paradox of the current situation is that the underinvestment in the energy industry by the market is the correct economic outcome given the poor rates of return, as the best use of capital is in other industries where the rates of return are higher. The market solution is not concerned with volatility, but rather the expected rate of return. This inability of the market to provide adequate incentives for investment in reserve capacity to reduce price volatility is where the market fails and why more dramatic action is required. Further, the current market and regulatory structure reinforces this price volatility as it emphasizes efficiency over reliability. In addition, a combination of regulation, taxes, and direct market intervention have further reduced the return on capital in the energy industry. As a result, the market has responded by not providing the capital to expand, and the net result is the capacity constraints that you see today.

RESPONSE OF GUY CARUSO, ADMINISTRATOR, OFFICE OF ENERGY INFORMATION ADMINISTRATION TO QUESTIONS OF HON. HILDA L. SOLIS

Natural Gas Supply and Demand

Question 1. Mr. Caruso, your testimony focuses on the supply side of natural gas. I would like to know if, as you find, a 1% drop in natural gas production leads to 5-10% higher prices, what would a 1% drop in demand do in terms of lowering prices.

Answer 1. A 1% drop in demand (for whatever reason) would tend to lower peak winter prices by about 5%-10%, a reaction roughly similar in absolute magnitude (but opposite in sign) to the impact from production shifts.

Natural Gas Price Fluctuations

Question 2. Mr. Caruso, your testimony indicates that fluctuations in weather have major impacts on the price of natural gas. Computer models of expected climate change due to greenhouse gas emissions predict that weather fluctuations will become more extreme in the future, and some evidence suggests that this is already occurring. Have you analyzed how expected and observed climate changes will affect natural gas price fluctuations?

Answer 2. EIA has not done an analysis that links global climate change to increased domestic weather variability to natural gas price volatility.

CMS ENERGY
JACKSON, MI
July 21, 2003

The Honorable BILLY TAUZIN
Chairman, Energy and Commerce Committee
2125 Rayburn House Office Building
Washingtn, DC 20515

DEAR MR. CHAIRMAN: Thank you for the opportunity to appear before the Energy and Commerce Committee on June 10, 2003, to testify about natural gas supply and

demand issues. It was a great opportunity for the local distribution industry to get our message out.

I have attached, at your request, answers to questions provided by Congresswoman Hilda Solis.

Again, thank you for the opportunity to testify before your committee.

Sincerely,

CARL L. ENGLISH
President and Chief Executive Office , Consumers Energy

THE HONORABLE HILDA L. SOLIS

Question 1. Mr. English, your testimony claims that federal policies have "locked up" resources for development. Yet the EPCA "Scientific Inventory of Onshore Federal Lands' Oil and Gas Resources and Reserves and the Extent and Nature of Restrictions or Impediments to their Development" shows that only 12% of the major western basins known to contain most of the gas supplies are off limits to drilling. Would you suggest that more than 88% of public lands be open to drilling?

Response: At a time when natural gas demand is expected to increase as much as 50 percent in the next 20 years, up to 59 percent of the gas resources yet to be discovered are expected to be found on federal lands or in offshore waters, according to the United States Geological Survey. In the Rocky Mountains, as much as 40 percent of gas resources are off-limits to leasing or have highly restrictive lease conditions. The issue is not necessarily the "known" producing gas basins—but is the opportunity to make new gas discoveries is areas less drilled and thus add "new" supplies for the nation's gas energy requirements. Ultimately, environmentally sound testing of gas prospects—with the drill bit—is the only way to know if natural gas can be developed from an area.

Question 2. Given that the 12% closed to drilling includes major National Parks and wilderness areas, would you ask to open these areas to drilling, despite overwhelming public support to protect these areas from resource extraction?

Response: Clearly not all areas should be opened to drilling or mining or other surface activities. But the debate must be examined on the basis of good science and choices be made regarding the impacts of energy development activities. Citizens should have a voice in these decisions, as they should regarding the implementation of any sustainable energy resource, such as wind and solar power generation, biomass and other options. Unfortunately, no sustainable energy resource is a zero impact proposition. Therefore, actions should be measured and carefully examined. However, no action is a poor choice for our economy and our people.

June 18, 2003

The Honorable W.J. "Billy" Tauzin
Chairman
Committee on Energy and Commerce
U.S. House of Representatives
Washington, D.C. 20515-6115

Dear Mr. Chairman:

On behalf of Anadarko Petroleum Corporation, thank you for giving me the opportunity to testify before the House Energy and Commerce Committee on June 10, 2003, on the implications of our tightening domestic natural gas supply/demand balance.

This letter is to provide additional information on issues and questions raised during the hearing by a number of members, and in particular by Representatives Shadegg, Degette and Solis. Therefore, I ask that this letter as well as supporting information I am attaching be included in the official record of the committee hearing for June 10, 2003.

A number of members questioned how access to public lands and the regulation of those lands is affecting industry's ability to explore and develop their extensive natural gas resources. In particular, they cited the EPCA "Scientific Inventory of Onshore Federal Lands' Oil and Gas Resources and Reserves and the Extent and Nature of Restrictions or Impediments to their Development," which shows that only 12 percent of the major Western basins known to contain most of the gas supplies are off limits to drilling.

It's important to understand that this 12 percent figure refers only to lands that are under *actual moratoria.* This study does not take into account how the current regulatory process is hindering and in some cases prohibiting exploration and development of oil and gas resources through long, costly delays.

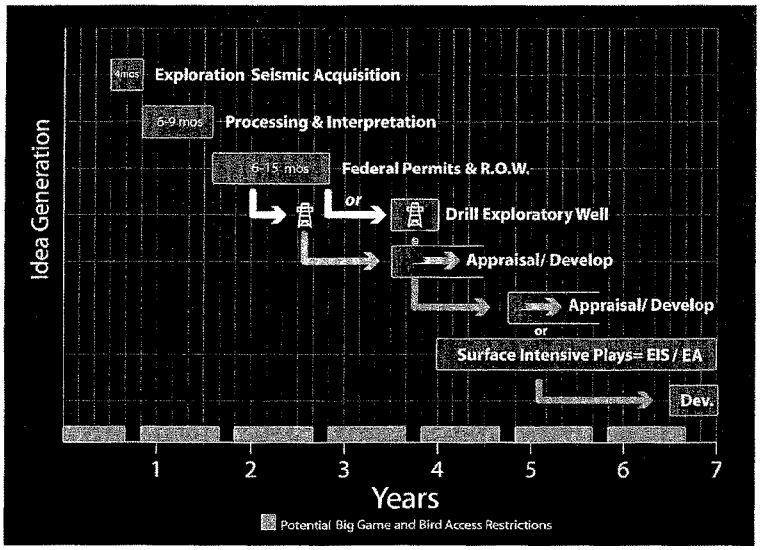
Because there are no clear and consistent rules or timeframes under which regional BLM officials must review exploration and development projects – and because there is a shortage of BLM staff to conduct these reviews in a timely manner – it may take six years to get approval to move to the development drilling stage.

In certain areas, by the time operators:
- *conduct archeological clearance assessments*
- *complete environmental impact statements*
- *wait for their review by BLM staff*
- *conduct additional follow-up studies that the BLM may decide to require*
- *wait for a permit to be issued for each well*
- *throughout the process work around seasonal shutdown periods related to wildlife protection and weather conditions (which may total as much as seven or eight months a year)*

many projects are simply not economic to pursue.

To illustrate this point, I've attached a graphic that shows the timeline we often encounter on new exploration projects in Wyoming. The bars in orange at the bottom represent periods when we may be prohibited from operating because of restrictions to protect big game animals, sage grouse, mountain plovers, raptors and prairie dogs.

As this graphic illustrates, the operating window is already very short, so even a delay of a few weeks in getting a permit to drill a well can potentially delay that project an entire season, not just a few weeks.



Meanwhile, operators must contract and pay for rigs and services ahead of time, with no assurance that we will have federal approval to move forward with development.

These obstacles – combined with the fact that litigation that may also tie up projects for months or years – are the kind of *de facto* barriers that are not transparent in data you may see on federal land moratoria, but they are very real. They are preventing much-needed gas resources from being developed for use by American consumers and businesses.

Some of the committee members also inquired about various amounts of acreage and resources that are believed to be affected by moratoria and regulations. I will summarize this data in this letter, and also refer you to attachments that provide a more detailed look:

According to BLM data:

- 68 percent of undiscovered oil and 75 percent of undiscovered natural gas in the U.S. is estimated to be under federal lands.

A 1999 National Petroleum Council natural gas study estimates there are:

- 346 trillion cubic feet (Tcf) of natural gas under federal lands in the West, but 40 percent, or 137 Tcf, is highly restricted or banned for leasing. (Note that only 8.6 percent is contained in areas actually designated as national parks and wilderness areas and therefore off limits, but nearly 32 percent of the gas resources found on federal lands in the West is extremely high cost due to a mosaic of restrictions.)
- 21 Tcf of natural gas off the West Coast, and 100 percent is under moratoria.
- 31 Tcf of natural gas off the East Coast, and 100 percent is under moratoria.
- 43 Tcf of natural gas in the Eastern Gulf of Mexico, and 56 percent, or 24 Tcf, is under moratoria.

Industry assessments show that less than 17 percent of total federal mineral estate is leased today, compared to 72 percent in 1983.

If I may reiterate a point I made in my oral testimony: The reason it is so important to make these federal lands and waters more accessible for exploration is, these basins have

not been highly explored. *These are the areas where the most economic resources can be explored, developed and produced at prices Americans can afford.*

High natural gas prices in 2003 can be directly traced to the fact that discoveries made today in our traditional producing basins have fewer reserves, lower production rates and steeper decline curves. This is by definition high-cost gas.

The oil and gas industry is not asking for permission to explore in national parks or specially designated wildness areas – unless valid leases that pre-date these off-limits designations are in place. In those cases, the rights of the lessee should be properly addressed.

But in other areas, where oil and gas activities are clearly compatible with multiple land use policy, industry should be allowed to explore and develop oil and gas under a clearly defined, consistent and efficient regulatory structure that does not create costly delays. We do not have such as system in place today, and this is preventing exploration and development of natural gas supplies that are desperately needed.

I would also comment that in evaluating new areas for potential wilderness designations, lawmakers should more diligently weigh the economic cost of withholding this land against environmental considerations. In many instances, by selectively excluding relatively small portions of federal lands or waters from areas to be closed off from leasing, Congress can make a very large amount of oil and gas available for exploration and development. But unfortunately, these cost-benefit considerations are often ignored.

I hope this information will be helpful to your committee as it pursues a solution to our pressing need for additional natural gas supplies. I hope we can continue this open and constructive dialogue.

Best regards,

Richard J. Sharples
Senior Vice President, Marketing & Minerals
Anadarko Petroleum Corporation

Attachments

cc: The Honorable Joe Barton
The Honorable Barbara Cubin
The Honorable Gene Green
The Honorable Diana Degette
The Honorable Ralph M. Hall
The Honorable Christopher John
The Honorable John B. Shadegg
The Honorable Hilda L. Solis
William Cooper, Esq.

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