

STATEMENT
OF
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U.S. DEPARTMENT OF ENERGY
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COMMITTEE ON GOVERNMENTAL AFFAIRS
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Mr. Chairman and members of the Committee, I am pleased to be here today to discuss the Administration's energy policy, particularly in relation to oil and gasoline. The Clinton Administration is very concerned about the high gasoline prices Americans are facing, particularly in the Midwest.

As you know, the Department of Energy compiles and analyzes data with respect to crude oil and gasoline supplies and also tracks prices. I must emphasize, however, that the Department does not analyze or investigate whether or not the market price for crude oil or gasoline is reasonable. The Administration has requested an investigation by the Federal Trade Commission of the unexplained recent behavior of regional gasoline prices.

I would like to begin my testimony by summarizing two key principles behind the Administration's national energy policy, followed by a summary of the key challenges and policy and regulatory actions the Administration has taken in support of that policy.

The Administration's "First Principle": Reliance on Market Forces

The "first principle" of the Administration's energy policy has been a reliance on free markets as the best means of informing supply and demand, and getting the most for the American consumer. Our commitment to this principle has contributed to the longest period of sustained economic growth in modern times.

The unprecedented economic expansion under this Administration has pushed the overall unemployment rates to 30-year lows, led to increased labor productivity, generated extraordinary gains in the nation's stock markets, given us the first federal budget surpluses in several decades, and helped to significantly reduce poverty rates, all while maintaining low levels of inflation.

This does not mean market failures will not occur. When markets are insufficiently flexible to address critical national challenges . . . market transformations require market pushes and pulls. . . or groups of individuals or businesses are threatened by market disruptions or dislocations. . . this Administration has not hesitated to take appropriate action. Examples of interventions in the energy arena include: the release of emergency LIHEAP funds during last winter's home heating oil crisis; support for a home heating oil reserve in the Northeastern United States, and; support for tax incentives for renewable energy or to increase domestic oil and gas production.

I would also note that the extreme volatility in oil markets we have witnessed in the last year and half – where oil prices have gone from \$10 per barrel to \$34 – are testament to the folly of artificial production quotas. Markets, not cartels, should set the price of oil. This bipartisan view has been expressed again and again over the last twenty years, as the Congress systematically removed or severely limited the federal government's authorities to set oil prices or allocate supply. Generally, with the exception of emergency authorities, the Congress has taken the government out of the oil equation and committed us to the free market principles of supply and demand.

Economic Growth, Energy Use and Environmental Protection are Not Mutually Exclusive

At the same time that the economy has been steadily growing, many of the environmental consequences of energy use have been reduced. Let me illustrate.

- Since 1990, at the same time the US economy has grown by 35 percent, sulfur dioxide emissions have declined by around 20 percent;
- The energy intensity of our economy -- the amount of energy used per unit of economic output -- has declined by 40 percent since the mid-seventies;
- In 1974, we consumed 15 barrels of oil for every \$10,000 of gross domestic product -- today we consume only eight barrels for every \$10,000.

Energy use, while increasing, has been out-paced by the economic growth achieved by the Clinton/Gore Administration. Also, increased energy efficiency – in homes, businesses and manufacturing – has helped insulate the economy from short-term market fluctuations in energy prices. Through wise policy choices and informed, targeted investments of public dollars, we can have an extremely robust economy fueled by relatively inexpensive energy, and protect the environment and the health of our citizens.

Challenge #1: Maintaining America's Energy Security in Global Markets

The United States remains heavily dependent on crude oil. Since 1985, domestic crude oil production has declined by 34 percent, while domestic oil consumption has increased by more than 22 percent. In 1974, net imports of crude oil and products supplied about 35 percent of U.S. consumption. In 1999, net imports supplied about 50 percent of U.S. consumption.

The Administration's response to the important role of oil in our economy and the increase in net imports recognizes the following:

- Consumption of oil continues to grow;
- The cost of oil production in the U.S. is high relative to other producing nations;
- The price of oil is a *world* price. High or low prices of oil worldwide will mean high or low prices domestically;
- Reducing volatility in oil prices will spur investment and match supply to demand;
- Global capacity must be increased if we are to meet domestic and international demand for oil;
- Increasing net imports are not only an indicator of flat or declining domestic production, but also a reflection of increased domestic *consumption*;
- Almost two-thirds of our oil is used for transportation.

To spur domestic production and lower the costs of doing business – without imposing quotas on imported oil, which would raise costs to consumers – the President has proposed tax incentives for 100 percent expensing of geological and geophysical costs (G&G), and allowing

the expensing of delay rental payments. G&G expensing will encourage exploration and production. Delayed rental expensing will lower the cost of doing business on federal lands.

The Administration has also supported and promoted virtually all significant energy legislation enacted by the Congress over the last seven years. This includes legislation for: Deepwater Royalty Relief; lifting the ban on the export of Alaska North Slope Oil; Royalty Simplification; privatization of the Elk Hills Naval Petroleum Reserve; the transfer and lease of Naval Oil Shale Reserves One and Three for production; and creation of a guaranteed loan program for small domestic oil and gas producers. The Administration has also proposed legislation to transfer Naval Oil Shale Reserve Two to the Ute Indian Tribe for production; USGS estimates that there may be as much as 0.6 tcf of gas on this property.

To address higher US exploration and production costs compared to other countries, we have invested in a portfolio of technologies designed to lower the costs of exploration and production, and to produce hard-to-find oil in more mature fields. In large part because of the joint R&D efforts of government and industry, the U.S. petroleum business has transformed itself into a high-technology industry.

The United States is a mature oil-producing region. While an estimated two-thirds of all U.S. oil remains in the ground, much of it is located in deep, complex reservoirs or environmentally-sensitive areas. Development of advanced oil and gas technologies is essential to efficiently maximize the production of domestic resources while preserving the environment.

A single project in DOE's five-year, \$118 million government/industry Oil Reservoir Class Program has already added 2.4 million barrels of oil from one field and produced an additional \$12.7 million in taxes and royalties. The final outcome of this project is expected to produce an additional 31 million barrels of oil and \$160 million in federal revenues.

The Department of Energy conducted the initial design of the polycrystalline drill bit, now used in about 40 percent of drilling worldwide, with annual industry sales in excess of \$200 million. Innovations such as horizontal drilling have revitalized oil production from the Austin Chalk region of Texas to the Dundee formation of Michigan. New imaging technologies developed by DOE labs are revealing large hydrocarbon supplies beneath the ocean floor salt formations in the Gulf of Mexico and 3D seismic is now standard in the industry. Secondary gas recovery technologies have led to new gas production from south Texas and the mid-continent. In Alaska, oil is now being produced from wellpads that are one tenth the size of those 30 years ago.

Industry and the Department of Interior estimate that new discoveries in the Gulf of Mexico may yield as much as 18 billion barrels of oil — more than Prudhoe Bay. Technological innovations in subsalt imaging, reservoir characterization, and drilling technologies will enhance our ability to economically produce these reserves.

To ensure that we are not overly reliant on imports from a single region of the world, we have

diversified our sources of supply. Although our oil imports have increased, our *sources* of these imports have changed significantly over the last two decades. Last year, we imported 4.85 million barrels of oil per day from OPEC nations, down 22 percent from the 6.19 million barrels of oil per day in 1977. Our imports now come from over 40 countries.

During this same period, OPEC's share of the world market has dropped from 49 to around 41 percent. In 1970, the top six producing countries in the world controlled 68 percent of the world's production; this figure is now down to 45 percent.

I note that just recently, a significant oil find was made in the Caspian Basin which is thought to have potential reserves equaling or surpassing the North Sea. The Administration has invested in a significant diplomatic effort to encourage oil development in this region, as well as to encourage the investment of U.S. energy firms in the Caspian.

To help the world develop its oil resources and increase world capacity, Secretary Richardson has actively promoted investment and development of the world's energy resources. Most notably, Secretary Richardson has held two international energy summits — the Western Hemisphere Energy Ministers Summit in New Orleans and the African Energy Ministers Summit in Tucson, to discuss energy issues and plot a course for global energy development. In addition, the Secretary has traveled to virtually all the major energy producing regions of the world — the Caspian, Russia, the Middle East, Nigeria, Norway, Mexico, and Venezuela — to encourage energy production and business for U.S. energy companies.

To increase the coverage provided by our “national energy insurance policy,” the Strategic Petroleum Reserve, we are adding 28 million barrels of oil to fill the Reserve back to the 590 million barrel level, its approximate size prior to the revenue-raising sales directed by the Congress in 1996 and 1997. The replacement of this oil in the Reserve was also done through a unique royalty-in-kind payment, with no outlays for the government. In addition, we have completed upgrades for the Reserve -- to make it safer and to extend the useful life of the facility. This seven-year project was completed ahead of schedule and under budget.

To address volatility in world oil markets, we have strengthened our ties with the world's oil producing nations, worked closely with oil consuming nations through organizations such as the International Energy Agency, and launched a campaign to improve the collection, dissemination and understanding of world oil supply and demand data. Last January, prominent industry analysts and data experts met at a DOE-sponsored forum in Houston to discuss how the quality, timeliness and availability of oil data might be affecting volatility in oil prices.

DOE will be co-hosting an international conference in Spain this summer as a follow-on to the earlier meeting. There is significant international interest in this issue and growing consensus that the world needs better data for producers and consumers to more accurately gauge oil supply, demand and inventories.

We are also investing in reducing net oil imports by focusing on demand side technologies and

policies. More than 60 percent of our oil consumption is for transportation, making vehicle fuel efficiency a ripe target for reducing the consumption side of the net import equation.

Specifically, the Department's transportation program is:

- developing an 80 mile-per-gallon (mpg) prototype sedan by 2004 through our Partnership for Next Generation Vehicles Program;
- improving light truck fuel efficiency by 35 percent while meeting newly issued EPA Tier 2 emission standards by 2004;
- developing technologies to increase fuel economy of the largest heavy trucks from 7 to 10 mpg (nearly 50 percent) by 2004;
- increasing domestic ethanol production to 2.2 billion gallons per year by 2010;
- develop production prototype vehicles that will double the fuel-efficiency of tractor trailer truck and triple the efficiency of heavy-duty pick-ups; and
- supporting tax credits for hybrid vehicles.

Let me illustrate just how important these investments are. Increasing the average fuel economy for cars and light duty vehicles by just three miles per gallon would save almost *a million barrels of oil per day*. This represents about 10 percent of current U.S. daily imports. Investing in fuels and more fuel-efficient vehicles could substantially reduce our reliance on imported oil at the same time it contributes to a cleaner, healthier environment. Without minimizing the importance of increased oil production, it is clear that even a small commitment to greater vehicle efficiency will net significant gains in reducing net oil imports, without compromising pristine onshore or offshore environmental ecosystems. Those demand side technologies will be crucial for meeting world oil requirements; for example, China alone is projected to add more than 150 million vehicles over the next two decades.

The Reformulated Gasoline Program

Before I outline other features of the Administration's energy policy, I would like to turn briefly to gasoline supply, an issue which is foremost in the public's mind these days.

Retail prices for both gasoline and diesel fuel are much higher this year than last, driven mostly by the rise in world crude oil prices. While there is significantly more oil on the market (2.1 million barrels) since OPEC met in March, demand is also increasing. This is true worldwide, as well as in the United States, where summer demand is about 4 percent higher than last year. To meet this demand, U.S. refineries are running full out, at around 96 percent utilization rates on a national average.

It is in this context that we have been reviewing the gasoline supply situation, particularly in the

Midwest. I would note that the Department of Energy performs gasoline supply assessments for specific areas as part of the EPA's waiver process for cleaner gasoline. DOE does not perform any specific price analysis.

To promote cleaner motor vehicles and cleaner fuels, the 1990 Clean Air Act Amendments established the RFG program. In 1995, this program introduced to the market new, cleaner fuels that had to meet more stringent emissions performance requirements. The Act required that RFG contain at least 2 percent oxygen by weight. The addition of oxygenates causes gasoline to burn cleaner and more efficiently, thereby reducing toxic air pollutants. The two oxygenates used by the refining industry to produce RFG are methyl tertiary butyl ether (MTBE) and ethanol. The RFG program has produced substantial environmental benefits. Phase I of the RFG program (1995-1999) reduced overall toxics by an average of 27 percent. Phase II, beginning this year, has more stringent standards that will reduce smog pollutants by 41 ,000 tons per year in RFG areas, including volatile organic compounds (VOCs) by 27 percent, and nitrogen oxide emissions (NOx) by seven percent.

The Phase 1 RFG *price* differential over conventional gasoline was on average two to four cents per gallon. Lunberg survey data conducted after the RFG implementation began confirms that the cost for phase 1 RFG was approximately three cents. Estimates for the additional cost of Phase II RFG (RFG II) compared to Phase 1 RFG would be one to three cents a gallon. The difference in cost between conventional gasoline and RFG II gasoline could be expected to be in the range of five to at most eight cents a gallon. Cost, however, is not necessarily an indication of price.

Administration Actions on Reformulated Gasoline Supply

There has been significant attention focused on gasoline prices and supplies and the impact of EPA regulations requiring the use of RFG, particularly the St. Louis, Milwaukee and Chicago regions. The Department of Energy continues to closely monitor conventional and reformulated gasoline supplies in these regions. In addition, the Department is aggressively pursuing policies and regulatory actions when appropriate to avert gasoline supply shortages and maintain adequate supply levels. Let me highlight some of the actions the Department has taken in recent months, followed by a more detailed description of the supply assessments the Department has completed.

- Federal Trade Commission (FTC) Investigation -- At the request of Vice President Gore, Secretary Richardson and Administrator Browner have requested that the FTC investigate the reasons for the significant price differential between RFG and conventional gasoline, a differential that cannot be attributed solely to the cost of RFG.
- St. Louis RFG Supply Assessment -- The Department conducted an assessment of RFG supply in St. Louis, providing information to the Environmental Protection Agency (EPA) that led to a temporary waiver of RFG requirements.

- Milwaukee/Chicago RFG Supply Assessment -- At the request of Vice President Gore, the Department completed an assessment of the RFG supplies in Milwaukee, Wisconsin. This assessment concluded that RFG supplies in Milwaukee are tight, but adequate.
- Meetings with Oil Industry Representatives -- The Department and the EPA have conducted in-depth meetings and interviews with oil industry representatives serving the Milwaukee/Chicago region to gather information on RFG gasoline supplies.
- Field Team Analysis -- The Department and the EPA recently sent field teams to both Milwaukee and Chicago to study the RFG supply situation. The field teams met privately with refiners, distributors, pipelines, terminal operators, jobbers and retail outlets.
- Strategic Petroleum Reserve (SPR) Oil Exchange -- The Department recently approved two agreements to exchange oil from the SPR with the Citgo and Conoco refineries in Louisiana. The agreements were approved to avert a possible shortfall in gasoline and diesel fuel due to the collapse of a commercial dry dock that is blocking shipments of crude oil through the Intra coastal Waterway near Lake Charles. Gasoline and diesel fuel from these refineries are sent into the Colonial Interstate Pipeline that serves the Mid-Atlantic and New England regions.

St. Louis Reformulated Gasoline Supply Report

The Department conducted an assessment of the impacts on RFG supplies in the St. Louis metropolitan area resulting from Explorer Pipeline break in the shipment arriving May 18, 2000. This assessment was conducted at the request of the EPA which had received a request from the State of Missouri for regulatory relief.

The RFG supply problem in St. Louis originated from a break in the Explorer Pipeline coming from the Dallas, Texas area in early March. The Explorer pipeline provides about 50 percent of supply capability to the St. Louis metropolitan area RFG market. The pipeline break, along with strong RFG demand, prohibited distributors from building adequate RFG inventories.

The Department worked closely with EPA, the State of Missouri and other sources to access supply information. The Department found that gasoline supply in the St. Louis area was tight, but noted that gasoline supplies were tight nationwide. Retail shortages would be certain for a period of days if the EPA did not offer a waiver that permits noncomplying product in or near St. Louis to be used in the St. Louis market.

Milwaukee/Chicago Reformulated Gasoline Supply Report

The Department performed an assessment of Milwaukee RFG2 gasoline supply for EPA on May 25, and determined that there was tight but adequate supply. EPA did not grant a waiver at that

time since the impact of the Explorer pipeline break on Milwaukee/Chicago was less than a days supply. At the request of Vice President Gore, the Department conducted a reassessment of the Milwaukee/Chicago RFG supply situation. The Department submitted this report to the Vice President on June 5, 2000.

Based on data from the Energy Information Administration, and other information gathered from refiners, terminals and marketers serving the Milwaukee/Chicago area, the Department of Energy (DOE) concluded that reformulated gasoline (RFG) supplies for the region are very tight, but that sufficient supply was available to meet overall demand at that time. This did not mean that supply was available to all marketers at all locations. Also, supply is still sufficiently tight that any disruption in the distribution system could contribute to Phase II RFG shortages. This is likely to remain the case in the near term and over the summer.

The Milwaukee/Chicago RFG situation should be viewed in the context of an overall U.S. gasoline market, in which high consumer demand and low inventories have caused higher prices for all gasoline types, relative to crude oil prices. The Milwaukee (and Chicago area) supply situation is further affected by:

an RFG formulation specific to the area;

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- higher regional demand;
- high regional refinery utilization rates;
- limited alternative supply sources;
- limited transportation links, and;
- lower gasoline inventories relative to the rest of the country.

These supply issues will affect price but the degree to which they contribute to price spikes is unknown. Also, the latter four conditions affect the supply of conventional gasoline as well.

The first opportunity for any significant relief from this tight supply situation will most likely be due to reduced seasonal demand in the fall. The lack of any significant inventory cushion in the Milwaukee/Chicago area is reason to continue to closely monitor the situation throughout the summer and we will do so.

Current Situation: Based on contacts with all the refiners and major terminals serving the Milwaukee/Chicago area, RFG supplies appear to be tight but adequate to serve immediate supply needs. Terminals received significant shipments of RFG off the West Shore Pipeline, prior to the pipeline's closure. Larger than usual volumes of RFG arrived from the Koch (Pine Bend, Minn.) refinery via a different pipeline at regular intervals.

This does not mean that all marketers will be able to get all grades of product, in the desired amounts, at all times. Regular customers --branded or unbranded --may be put on allocation but are still first in the queue. Spot market buyers, including many independent marketers and convenience store operators, may not find product available at their regular terminals before new

product arrives. Spot market buyers, on the other hand, are the most vulnerable in these situations because they have no long-term contract commitments and could be forced to incur- and forced to pass on -higher costs, as they move from terminal to terminal looking for product.

Longer Term Situation: Aside from possible problems in the pipeline links to Milwaukee, the key longer-term consideration is refinery capability for producing summer ethanol-blended Phase II RFG and significant uncertainties remain (As noted above, the prices in the Midwest are affected by several supply-related factors, not all of which are specific to RFG). While there has been referrals to the Unocal patent, no one has identified any cost or supply issues related to the patent that could in any way explain the price increase and decrease for wholesale RFG that we have seen in the Midwest over the last few weeks.

Some refineries serving the Chicago/Milwaukee area may increase their output by a small amount through increasing crude runs, shifting production from conventional gasoline to RFG, or making limited equipment modifications. All of these opportunities are very limited and depend on crude oil and gasoline market conditions. The higher returns now available with RFG provide a strong incentive to increase refinery production and are, to a significant degree, responsible for the current re-balancing of the Milwaukee RFG market. The typical reduction in driving and gasoline demand that occurs after Labor day offer the prospect for relief.

As noted earlier, Midwest refinery utilization rates are at 99 percent and average rates nationwide are at 96 percent. There is little margin for error, given these utilization rates. Unexpected refinery outages, which occur more often at high utilization rates, are the greatest risk to maintaining supply/demand balance. However, such an event, would affect the availability of all petroleum products.

Given the nature of the RFG specification in the Milwaukee/Chicago area, the limited number of alternative sources of supply, and the tightness in national, PADD II, and Milwaukee/Chicago inventories, it is appropriate to closely monitor this situation throughout the summer.

I have addressed the Administration's overall support for oil production and would like to turn briefly to other elements of our energy policy. I outlined our principles and our energy security challenge, and would like to now outline three remaining challenges we are addressing through policy, regulatory, and research and development actions and investments.

Challenge #2: Harnessing the Force of Competition in Restructured Energy Markets

As I have noted, the Clinton/Gore approach to energy policy is built around the principle of

market-oriented approaches to energy supply and use. A reliance on markets is not unique to our Administration – it spans both Republican and Democratic Administrations.

Natural gas is a clear area of success for market-driven energy policies for recent Administrations. With deregulation, natural gas has emerged as a plentiful, national energy resource. In the mid-1970's, a labyrinth of outdated and counterproductive pricing regulations had handcuffed America's natural gas industry, stifling exploration and production and conveying the false impression that America's natural gas supplies were on the wane.

Today, the onerous natural gas regulations which started in the 1950s, have been replaced by a restructured and highly competitive gas market, and natural gas is now one of the most plentiful energy resources available to meet the Nation's future energy and environmental needs. The decontrol of natural gas prices, the advent of competition in interstate gas transportation, and the ability of industrial customers (and increasingly residential consumers) to contract directly for their own gas supplies has clearly provided major benefits to both producers and consumers.

Electricity restructuring is the biggest prize of all. Over 40 percent of the nation's energy bill goes for electricity. With over \$200 billion in annual sales, electricity is the lifeblood of our economy, and the reliable supply of electricity is vital to our economy and to the health and safety of all Americans. The Clinton/Gore Administration is seeking, with Congress, to extend the role of markets and competition into the electricity sector.

At one time, the debate surrounding electricity restructuring focused on the pros and cons of doing away with the vertically-integrated monopoly utility that generated, transmitted and distributed the power consumed in a state-designated monopoly service territory. That debate is over. As a result of the Energy Policy Act of 1992 and the efforts of the Federal Energy Regulatory Commission (FERC), utilities are now buying power from competing generators and marketers at competitive rates rather than building plants on their own, and independent power producers are gaining an increasing share of the generation market.

Restructuring and competition are not, of course, limited to the wholesale markets. Twenty-five states have now adopted electricity restructuring proposals that allow for competition at the retail level. Almost every other state has the matter under active consideration.

These are positive developments -- competition, if structured properly, will be good for consumers, good for the economy and good for the environment. Companies that had no incentive to offer lower prices, better service, or new products are now being required to compete for customers. Consumers will save money on their electric bills. Lower electric rates will also make businesses more competitive by lowering their costs of production. By promoting the use of cleaner and more efficient technologies, competition will lead to reduced emissions of

greenhouse gases and conventional air pollutants.

Securing a Competitive Future Requires Both State and Federal Action. We believe that the full benefits promised by electricity competition can be realized only within an appropriate Federal statutory framework. What we do at the Federal level, and when we do it, will have a profound impact on the success of wholesale competitive markets, as well as on state and local retail markets. Federal action is necessary for state restructuring programs to achieve their maximum potential. Electrons do not respect state borders. Electricity markets are becoming increasingly regional and multi-regional. Actions in one state can and do affect consumers in other states.

States and the Federal government must work together. States alone can't ensure that regional power and transmission markets are efficient and competitive. They can't provide for the continued reliability of the interstate bulk power grid. And states can't remove the Federal statutory impediments to competition and enable competition to thrive in the regions served by Federal utilities. Clearly, some states are considering retail competition proposals at a less rapid pace than others. Nevertheless, Federal action is equally important to all states. If wholesale markets, which transcend state boundaries, are not working efficiently, the impediments to the flow of power between states will cause rates to go up and reliability to be endangered.

The Clinton/Gore Administration encourages Congress to pass comprehensive electricity restructuring legislation. In 1998 and again in 1999, the Administration presented the Congress with a comprehensive legislative blueprint of changes needed for updating the federal statutory framework to support the advent of competition in electricity markets. Indeed, this bill was a featured element of the Comprehensive National Energy Strategy the Administration sent to Congress in April, 1998.

A well-structured electricity bill is a centerpiece of the Administration's energy policy, and we look forward to working in a bipartisan manner with both the House and Senate to pass this or similar legislation. We urge this Congress to replicate the earlier bipartisan successes with natural gas and oil deregulation and pass a comprehensive restructuring bill this summer.

Ensuring the reliability of the energy grid is a growing focus of the Administration's R&D efforts. While the electricity system powers other infrastructures, it will also be increasingly dependent on natural gas as a fuel source for both central power stations and small, distributed generation. EIA's *Annual Energy Outlook, 2000*, projects the annual growth of 4.3 percent for the use of natural gas for electricity generation through 2020.

In addition, our energy delivery systems are becoming increasingly reliant on telecommunications and computing systems for fast, efficient operation. These trends will likely result in increased efficiencies and a range of new consumer products, but can also potentially increase physical and cyber threats to our energy infrastructure.

To ensure the reliability and security of the electricity and natural gas infrastructures, the Administration has proposed a new Energy Infrastructure Reliability initiative with three components:

- electric reliability which will focus on regional grid control, distributed resources and microgrids, information system analysis, possible offsetting of peak summertime electric load with distributed generation and natural gas cooling technologies for example, and high capacity transmission;
- natural gas infrastructure reliability to include storage, pipeline and distribution R&D, and;
- secure energy infrastructures, vulnerability assessments, interdependency analysis, risk analysis, and the development of protection and mitigation technologies.

We urge the Congress to support this initiative fully so as to address the urgent challenge of grid reliability.

Challenge #3: Mitigating the Environmental Impacts of Energy Use

The production, transport and conversion of energy is fundamental to our way of life and continued economic prosperity, but energy has more significant effects on the environment than any other economic activity. To reduce these adverse effects, the federal and state governments have imposed environmental restrictions on energy, from production to end-use.

These restrictions have, as noted earlier, resulted in reductions in energy-related pollution and environmental damage, and have been achieved without substantial increases in energy prices, disruptions in energy supplies or other adverse economic impacts. This achievement is due, in part, to the constructive role that the Department of Energy has played in the development of environment-friendly energy technologies and the adoption of regulatory policies that have enabled the energy industry to minimize costs and avoid supply disruptions.

We cannot, however, stop with the successes achieved to date. Domestically, one of the leading challenges facing us now is further reducing the environmental impacts of energy use in the transportation and power generation sectors. We want to minimize the negative effects of fossil fuel combustion in ways that do not increase prices or price volatility, or decrease reliability. Other domestic environmental challenges that will require careful monitoring include: assuring the continued access of the energy industry to new resource areas, in a manner that protects our natural heritage; and ensuring that any further regulation of the energy sector is based on good science and is cost-effective.

Internationally, responding to the threat of climate change is the greatest challenge facing the energy sector. To provide the technologies that reduce greenhouse gas emissions, and to preserve U.S. competitiveness and economic growth, President Clinton has proposed an

aggressive \$4.1 billion FY 2001 climate change package.

The package includes: the International Clean Energy Initiative, Clean Air Partnerships, Climate Technology Initiative and other programs that preserve jobs and the climate. This includes R&D and deployment initiatives for a broad range of technologies including those using fossil fuel. For example, the President's plan contains a significant request for coal and power systems technology and for carbon sequestration to offset the carbon emissions from fossil fuels.

We have a historic opportunity to complete the elaboration of an internationally unprecedented market-based approach to climate protection that will lower costs and spur U.S. technology exports. The anticipated use of these mechanisms will also provide the economic incentive for developing countries to make meaningful commitments to greenhouse gas emissions reductions. ***Sound science is the cornerstone of DOE's work on energy-related environmental issues.*** The Department has been a partner with EPA and other regulatory agencies in developing science-based regulations. This was seen recently in DOE's work with EPA on coal ash; and last year in our work with EPA on coal combustors of fossil fuels containing cobalt or vanadium. These are two examples where it was demonstrated, through science and interagency cooperation, that regulations of the energy industry were *not* needed.

Our work on climate change is part of the substantial body of scientific evidence that demonstrates the impacts of carbon emissions on the global environment, supports the Administration's commitment to mitigating the impacts of greenhouse gas emissions on the atmosphere and human health, and strongly suggests that significant and timely action to mitigate climate change *is* both prudent and needed.

Cost is a key consideration. The costs and benefits of alternative approaches must be weighed. To the extent feasible, the costs of reducing adverse environmental impacts should be shared fairly among all of the contributors to an environmental problem, not borne primarily by a small subset of industries or, in the case of global climate change, a small subset of countries.

Most recently, the Department of Energy helped develop the economic analysis for treating small refiners as a separate class of businesses under the recently released Tier II gasoline sulfur rule. This treatment for small refiners will give them additional time and flexibility in meeting the requirements of the rule.

An important element of the Administration's energy policy is support for the development of energy technologies to reduce environmental impacts of energy use by:

- promoting technologies to produce cleaner conventional fuels;
- increasing the efficiency in the use of conventional energy sources, primarily fossil fuels, and;
- developing alternative sources of energy.

Cleaner Fuels. On the transportation side of fuel use, vehicles currently account for a large portion of urban pollution, including 77 percent of carbon monoxide, 49 percent of nitrogen oxides, and 37 percent of volatile organic compounds. The transportation sector also generates one third of U.S. carbon emissions. In coming decades, increasing public health and environmental concerns will likely lead to new environmental regulations that may be difficult or impossible to meet with current fuels.

The President's *Bioenergy and Biobased Products Initiative* is intended to address this growing need. Recent scientific advances in bioenergy and biobased products have created enormous potential to enhance U.S. energy security, help manage carbon emissions, protect the environment, and develop new economic opportunities for rural America.

This nation has abundant biomass resources (grasses, trees, agricultural wastes) that have the potential to provide power, fuels, chemicals and other biobased products. The President has set a goal of tripling U.S. use of biobased products and bioenergy by 2010, which would generate as much as \$20 billion a year in new income for farmers and rural communities, while reducing greenhouse gas emissions by as much as 100 million tons a year – the equivalent of taking more than 70 million cars off the road.

DOE has also launched a new initiative this year, the *Ultra-Clean Fuels Initiative*, to address the need for cleaner fuels within the context of the current refining infrastructure. The Ultra-Clean Fuels Initiative will mobilize industry and DOE's national laboratories to develop and demonstrate new technologies for making large volumes of clean fuels from our diverse fossil energy resource base. In the nearer term, ultra-clean transportation fuels can be produced by upgrading refinery technology, and using new bio-fuel blends. In the mid-to-longer term, ultra-clean transportation fuels can be developed through biotechnology, or from natural gas and coal, which enjoy high levels of compatibility with the existing infrastructures and could provide environmental benefits due to their suitability for use in advanced, high-efficiency vehicles.

On the power side, fossil fuel-fired power plants emit about one third of the nation's carbon dioxide and significant amounts of NOX, SOX and particulates. These plants also account for 70 percent of all U.S. electricity generation and are projected to dominate power generation for the foreseeable future.

Technologies for coal-fired power plants, developed by DOE, have resulted in improved performance at a fraction of the original cost. Coal is used to generate almost 52 percent of the nation's electricity and scrubbers are now deployed on one-third of U.S. coal plants. Our partnerships with industry have resulted in rapid development of low cost NOx technologies to address both near term needs and future environmental challenges. The near term challenge has been met by the addition of low-NOx burner technology to virtually all coal-fired boilers, and even cleaner technologies will be installed on a substantial portion of coal units. These technologies are 50-90 percent cheaper than options available just 10 years ago.

To address pollution from coal and natural gas power systems, DOE has a program — *Vision 21* — with a goal of near-zero emissions from power generation and 60 to 70 percent generation efficiencies. The fleet of large, high-efficiency power systems envisioned by this program would produce emissions well below New Source Performance Standards for SOX, NOX, and particulates, with most advanced systems achieving near-zero emissions for regulated pollutants.

DOE's *Carbon Sequestration Program* is designed to develop technologies and practices to sequester carbon that: are effective and cost-competitive; provide stable, long-term storage; and are environmentally benign. Increased carbon emissions are expected unless energy systems reduce the carbon load to the atmosphere. Accordingly, carbon sequestration — carbon capture, separation and storage or reuse — must play a major role if we are to continue to enjoy the economic and energy security benefits which fossil fuels bring to the nation's energy mix.

Increasing Efficiency in the Use of Conventional Energy Sources. It is particularly important to develop and deploy higher efficiency technology for fossil energy power generation since 85 percent of America's energy currently derives from oil, gas and coal. In electricity generation alone, energy efficiency potentially could be doubled through cogeneration and the application of advanced technologies.

DOE's advanced turbines — fueled by natural gas or biomass, and capable of reducing NOX emissions and producing steam together with low-cost electricity — are already approaching efficiencies of 60 percent. High efficiency electric power systems, where fuel cells are joined with combined cycle plants, could improve efficiency to as much as 70 percent. Industrial resource recovery could be dramatically improved with the development of technologies such as an integrated gasification combined power technology, which would convert coal, biomass and municipal solid wastes into power and products.

The U.S. uses 94 quads of primary energy a year. The nation's 100 million households and 4.6 million commercial buildings consume 36 percent of the total. Buildings also use two thirds of all electricity generated nationally. Energy consumption in buildings is a major cause of acid rain, smog and greenhouse gases, representing 35% of carbon dioxide emissions, 47 percent of sulfur dioxide emissions and 22 percent of nitrogen oxide emissions. Clearly, more efficient buildings will pay big dividends in reduced energy use and a cleaner environment.

Research and development areas for buildings include: heating, ventilation, and air conditioning; building materials and envelope; building design and operation; lighting; appliances, and; on-site generation. To use energy more efficiently, we are working to develop "intelligent building" control systems, more efficient appliances, and fuel cells to power commercial buildings. Standards to improve the energy efficiency of fluorescent lighting in commercial and industrial applications, proposed this March, are expected to save between 1.2 and 2.3 quadrillion BTUs of energy over 30 years, enough energy to supply up to 400,000 homes per year over the same time period. We have recently proposed an update to the efficiency standards for water heaters, and expect to issue proposals for clothes washers and central air conditioners in the near future --

each of which are likely to produce even greater energy and environmental benefits.

The industrial sector consumed almost 35 quads of primary energy in 1997 – about 38 percent of all energy used in the United States. The industrial sector contains extraction industries, as well as materials processing and product manufacturing industries. Over 80 percent of the energy consumed in manufacturing (including feedstocks) occurs in only seven process industries: aluminum; steel, metal casting, forest products, glass, chemicals, and petroleum. These major process industries are becoming more capital-intensive. Markets are continuing to become more competitive globally.

Reducing energy costs and waste, and reducing or eliminating environmental emissions upstream (closely related to energy use) are recognized, controllable costs that can increase productivity and competitiveness of U.S. businesses and decrease costs.

The Department's primary program for industrial efficiency is *Industries of the Future*, which focuses on these seven most energy-intensive and supports collaborative research, development, and demonstration efforts to accelerate efficiency in U.S. industries.

If the Department's energy efficiency programs were fully funded, we could:

- reduce industry energy consumption per dollar of output;
- increase the average fuel efficiency of new cars and light trucks by 20 percent by 2010;
- reduce the annual energy consumed by buildings; and
- by 2010, reduce energy consumption in federal facilities by 35 percent relative to the 1985 consumption level, saving taxpayers \$12 billion from 2000-2010.

These reductions in energy demand will result in comparable reductions in greenhouse gas emissions, as well as reductions of other environmental impacts associated with energy use. Of course, none of this can be achieved without the active support of other agencies, industry and consumers. DOE looks forward to working with the Congress to develop and fund programs to increase the efficiency of our transportation, commercial, manufacturing and building sectors in order to save energy, increase the competitiveness of U.S. industry, and reduce our reliance on imported oil.

Investing in Renewable Power Sources. Renewable resources such as wind, solar, photovoltaics, geothermal, biomass, hydrogen, and hydroelectric, are abundant. These alternatives are used for power generation and their primary advantage is that they produce virtually no emissions or solid wastes. Their primary disadvantages are the cost of producing power (except some biomass, geothermal, hydro and wind) compared to coal and natural gas, and in some cases the need to create an infrastructure required to deliver this power to market.

To take advantage of the environmental benefits of renewable power, the Department has

focused on further decreasing its costs and tackling infrastructure issues. A particularly high-value approach to lowering cost and delivering renewable power appears to be through distributed generation — alternatives to central power stations, where power is generated locally or on-site. Among other benefits, this can reduce the investment needed in transmission and distribution systems and the losses in transmitting power. Distributed generation technologies are a major R&D focus at DOE.

In addition, *the Department is working on improving the performance of specific kinds of renewable energy.* The growth for wind power, for example, is the highest of all sources of energy in the world. Dramatic improvements in wind turbine technology has helped spur a 25 percent increase in wind-generating capacity over the last decade. Costs of wind generated power have dropped dramatically to between four and six cents per kilowatt hour. Photovoltaic costs are down from one dollar in 1980 to between twenty and thirty cents today. Geothermal costs are almost competitive with conventional power generation costs, coming down from fifteen cents to between five and eight cents today.

Last year, the President issued an *executive order directing agencies to expand their use of renewable energy.* Meeting the goals of this order will reduce greenhouse gas emissions by 2.4 million tons and save taxpayers over \$750 million a year. It will also expand markets for renewable technologies, reduce air pollution, and serve as a powerful example to businesses and consumers who can reap substantial benefits from environmentally-friendly energy sources.

Challenge #4: The Government's Commitment: Ensuring a Diverse, Reliable and Affordable Set of Energy Sources for the Future

The energy options within our portfolio are oil, gas, coal, energy efficiency, renewables, hydropower, fission, and fusion. We must strategically manage energy R&D with this understanding about the energy world as we know it: there is no single silver bullet which will solve all our energy needs, making science and technology -- and a broad-based energy R&D portfolio -- is key to meeting our long term energy needs..

Without energy technologies, a ton of coal, a barrel of oil, a cubic foot of natural gas, a ton of uranium ore, a stiff breeze, or the sun's warmth cannot directly contribute to the prosperity of modern society. With the very best technologies, however, society can use energy resources efficiently and responsibly and with great economic and environmental gain. While economic and security challenges continue to demand investment in a robust energy research and development (R&D) program, environmental challenges provide additional impetus for increased focus on energy-related science and technology during the coming years.

Technology development plays a strong supporting role in the Department's pursuit of all of its energy policy objectives. It supports improvement in the competitiveness of the energy system; the development of more efficient transportation, industrial and buildings technologies as a key objective; our goal of reducing the environmental impacts of the energy sector, and; the further

development of technologies that reduce the environmental impacts of energy production.

The requirements for near term returns on investment, limited resources and the risk averse nature of many industries warrant a special role for government in the support of technology development, especially when new technology can help address national concerns not fully reflected in the marketplace. Consequently, the development of new energy technologies has been a central mission of the Department of Energy's since the late 1970's. At DOE , we focus on maintaining a strong national knowledge base as the foundation for informed energy decisions, new energy systems, and enabling technologies of the future, and developing technologies that expand long-term energy options.

Ensuring the success of the Department's research and development efforts has been a constant challenge, especially during periods of stable or declining energy prices, when market incentives for technology development and adoption are at their lowest. In addition, the unpredictability of technology development process and the continual changes in scientific knowledge, social priorities and market demands pose additional challenges to government efforts to effectively spur technology development.

I have already discussed many of DOE's energy technologies and technology investments and successes. I would now like to discuss our energy portfolio more broadly, and then focus specifically on natural gas as a transition fuel.

DOE's energy resources R&D portfolio is organized in three broad strategic areas: reliable and diverse energy supply (\$170 million, FY01 request); clean and affordable power (\$542 million, FY01 request), and; efficient and productive energy use (\$437 million FY01 request). In addition, the Department has a basic science portfolio (\$1.2 billion FY 01 request) which supplies the foundation for much of the applied R&D in the energy areas.

A number of reviews and studies have been conducted that provide valuable information on the adequacy and focus of this portfolio. Overall, these studies have confirmed that our energy portfolio is generally well-focused on the nation's strategic energy goals. However, the studies also have identified a number of deficiencies in how fully these goals are addressed by the portfolio and made a number of recommendations for important portfolio changes or additions, including:

- Significantly enhanced R&D funding
- Renewed emphasis on electric power systems reliability
- A Nuclear Energy Research Initiative
- Carbon management R&D
- Increased bioenergy R&D
- Methane hydrate R&D
- Hydrogen R&D
- Clean fuels R&D

- Integration of fuel cell R&D efforts
- An international RDD&D effort

Continued support for certain nuclear energy technologies is one way in which the Department is seeking to ensure diverse energy options for the future. The *Nuclear Energy Research Initiative* is focused on obstacles to long-term use of nuclear energy. It promotes investigator-initiated, peer reviewed research, enabling us to consider a broad range of innovative ideas brought forth from universities, industry, and our national laboratories to address issues such as plant economics, waste, and proliferation. Last year, 46 research projects were launched under NERI, involving 21 universities, eight national laboratories, 16 private sector organizations, and one federal agency. Just last week, the Department announced 10 new awards, involving 56 research projects, many with multiple organizations participating. A major area of focus for the NERI program this year are Generation IV nuclear power systems, which are next generation advanced technologies that are expected to be economically competitive and deployable over the next 20 years.

The Administration strongly supports the increased use of natural gas. Several of these recommended changes or additions to our portfolio relate directly or indirectly to natural gas — power systems reliability, carbon management, methane hydrates, clean fuels, and fuels cells all involve the development of technologies to increase the supply, improve the delivery of, or improve the environmental performance of natural gas.

Also, as I mentioned earlier, because it is abundant and relatively clean, natural gas will be the fuel of choice to meet the nation's future power generation needs. Of the 1000 new powerplants the Energy Information Agency (EIA) projects the U.S. will need by 2020, 900 will probably be natural gas power plants. Once this gas is produced, we will need the means to distribute it safely and efficiently. Right now, there are 85 proposed pipeline projects *just* for the years 2000 through 2002, and the Administration is working with the gas industry and other stakeholders to streamline the regulatory process.

Investments in natural gas R&D are critical to meet future energy needs. The Clinton/Gore Administration has invested roughly \$1.5 billion in natural gas R&D. DOE's joint efforts with industry have helped produce the fuel cells, microturbines, reciprocating engines, and other enabling technologies to power the gas industry of the future. DOE's request for natural gas R&D funding in FY 2001 is around \$215 million and, as I mentioned earlier, includes an initiative for energy infrastructure reliability. The natural gas portion of this initiative specifically focuses on methane leakage, aging and corroding pipelines, and natural gas storage, to improve the safety and reliability of the natural gas distribution network.

Last December, Secretary Richardson established *DOE's newest national laboratory — the National Energy Technology Laboratory*, co-located at Morgantown, WV, and Pittsburgh, PA.

This laboratory is dedicated to providing the nation with clean and affordable fossil energy and will house a new *Center for Natural Gas Studies*, in order to give added focus and emphasis to natural gas policy and “bore hole to burner tip” research and development.

Presidential Decision Directive 63 — *Critical Infrastructure Protection* — *establishes safety and security of the natural gas infrastructure as a national security priority*. In addition, the Administration also envisions a substantial role for natural gas as the transition fuel for a cleaner environment, and in reducing greenhouse gases. The President’s *Executive Order on the Greening of the Government* promotes efficiency in federal buildings, acknowledging that there are substantial efficiency gains to be made by measuring energy from the source, not just at the site. Natural gas is a winner in this scenario.

The Administration’s *Comprehensive Electricity Restructuring bill* will benefit natural gas as well by providing for more rapid market penetration of innovative technologies on both sides of the customer’s meter. End-use distributed generation technologies, for example, have a critical role to play in a restructured energy future. Along with new uses for natural gas, these technologies promise relatively high efficiencies, low emissions, increased flexibility and reliability, and cost-effective alternatives to the traditional utility grid infrastructure.

To further develop natural gas power systems for the 21st century, DOE will be focusing on advanced combustion science and technology; interconnect devices and parameters for standard interconnect designs to enable distributed generation; low temperature catalysts for emissions control; inexpensive sensors for emissions monitoring, and; carbon dioxide separation and sequestration technology. For natural gas storage, we will be investing in developing non-damaging fluids for drilling, and methods for controlling reservoir damage caused by drilling and perforating fluids.

We need to encourage increased natural gas supply. The National Petroleum Council’s recent study on natural gas projects increased consumption for natural gas of 29 trillion cubic feet (TCF) in 2010 and 31 trillion cubic feet (TCF) by 2015. At the same time, EIA estimates that in 1998, reserve additions of natural gas were only 83 percent of production. To meet this demand, we will need to ensure that we have an adequate supply of natural gas.

Several pieces of legislation I described earlier — specifically the deep water royalty relief and the guaranteed loan program for small oil and gas producers — will benefit natural gas production, as will the G&G and delayed rental tax credits supported by the President. In addition, our energy supply R&D programs, designed to lower the costs of oil and gas production, will help add to the nation’s supplies of natural gas. These include:

- a *Diagnostics and Imaging Program* to cost-effectively locate and produce oil and gas reserves;
- the *Advanced Drilling, Completion and Stimulation Systems Program* which focuses on the development of sophisticated drilling technologies and

- methodologies;
- the *Gas Hydrates Program*, a long term R&D effort to help turn potential methane hydrates into gas reserves, and;
- the *Low Quality Gas Upgrading Program* to purify gas reserves containing high levels of contaminants.

Clearly, much remains to be done if we are to meet significant increases in demand for natural gas over the next two decades. We look forward to working with Congress in a bipartisan effort to increase the nation's supplies of natural gas.

Balanced, Forward-looking Energy Policy

The Clinton/Gore Administration is proud of its record on energy policy and on our progress in achieving the nation's energy goals. We are very concerned about the high gasoline prices American consumers are facing. We are committed to a responsible approach that will infuse our energy sector with both efficiency and competition; that values clean air and clean water; and that seeks to cushion America against emergencies in the energy market.

Secretary Richardson has called on the Congress to work with us in a bipartisan fashion to pass legislation for those energy incentives and programs which require Congressional action including:

- extension of the Energy Policy and Conservation Act;
- establishment of a northeast home heating oil reserve;
- added tax incentives for domestic oil and gas production, renewable energy, increased energy efficiency and the introduction of alternative fuels;
- electric industry restructuring legislation;
- replenishment of emergency LIHEAP funds, and;
- increased funding for R&D to reduce demand and increase domestic supply, as requested in the Department's FY2001 budget proposal.

I note that the House voted to cut \$126 million from the Partnership for Next Generation Vehicles and \$45 million from the Department's Fossil Energy program. As noted in my testimony, these programs support essential energy security goals on both the demand and supply sides. We appreciate the Senate's support of these R&D programs. They, together with our efficiency and renewable programs, have never been more important than they are today for meeting energy and environmental goals simultaneously.

We urge Congress to expeditiously enact the Administration's proposals. If we are going to meet the nation's energy needs of the 21st century, we have neither time—nor energy—to waste.

