Union of Concerned Scientists
Citizens and Scientists for Environmental Solutions

Union of Concerned Scientists
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January 7, 2005

Senator Pete Domenici
Chairman, Senate Committee on Energy and Natural Resources
Senator Jeff Bingaman
Ranking Member, Senate Committee on Energy and Natural Resources
United States Senate
Committee on Energy & Natural Resources
364 Dirksen Senate Building
Washington, DC 20510

RE: Proposals for Natural Gas Supply and Demand Conference

Dear Senator Domenici and Senator Bingaman:

On behalf of the Union of Concerned Scientists, I am writing in response to your request for suggestions regarding policy proposals that address concerns with natural gas supply and demand constraints, and rising natural gas prices. The Union of Concerned Scientists (UCS) is a nonprofit organization of more than 50,000 citizens and scientists working for practical environmental solutions. For more than two decades, UCS has combined rigorous analysis with committed advocacy to reduce the environmental impacts and risks of energy. Our energy program focuses on encouraging the development of clean and renewable energy resources, such as solar, wind, geothermal and biomass energy, and on improving energy efficiency.

We understand that the goal of this process is to find ways to reduce the cost of natural gas by identifying policies that increase natural gas supplies, and reduce demand for natural gas. In short, UCS believes that implementing policies to increase energy efficiency and renewable energy use for generating electricity would help to achieve both of these goals. These mechanisms are also needed to meet our future electricity needs, diversify our electricity supply, stabilize natural gas and electricity prices, improve our nation's energy security, and protect the environment. Specifically, we recommend that the Committee consider a renewable electricity standard—a market-based mechanism that requires utilities to gradually increase the portion of their electricity produced from renewable energy sources—as one of the most effective approaches for reducing our reliance on natural gas and stabilizing prices. In addition, we recommend a broad range of tax incentives and other financial support mechanisms to promote renewable energy and energy efficiency. Our detailed comments and recommendations—divided by issue area—follow below.

Sincerely,

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Alan Nogee, Clean Energy Program Director
Union of Concerned Scientists

Issue 5 - Diversification and Conservation. To what extent and how can demand be reduced through conservation and efficiency measures and through diversification of energy sources used for electric generation, industrial and other applications?

Domestic natural gas prices have reached historically high levels, more than doubling the prices experienced during the 1990s. Natural gas prices have also experienced periods of extreme volatility in recent years with prices spiking as much as 5 to 10 times historical levels. Much of the recent rise and increased volatility in prices can be attributed to the unprecedented surge in natural gas demand from new power plant construction in recent years (see Figure 1 in Appendix). Since 1992, more than 90 percent of the nation's growth in natural gas demand has been due to its increased use as a fuel for electricity generation.

Price pressures show no signs of abating as energy consumers increasingly rely on natural gas to heat homes, fuel businesses, and generate electricity. As a result, manufacturers, farmers, small businesses, local governments, retailers and families are struggling to pay these high natural gas prices. Some manufacturing facilities and industrial users that rely heavily on natural gas have already had to reduce operations or move their factories overseas. For example, U.S. chemical workers have lost approximately 78,000 jobs since natural gas prices began to rise in 2000.[1] Natural gas accounts for about 90 percent of the cost of fertilizer, creating an additional hardship for American farmers.

Congress can help American families and businesses by supporting affordable, achievable, and effective measures to reduce demand for and increase supplies of natural gas in the near and long-term. UCS believes that the fastest, cheapest, cleanest, and most secure action that Congress can take to alleviate high natural gas prices and supply shortages is to provide strong policy support for deploying renewable energy and energy efficiency technologies.

Relying primarily on supply-side options could take years to deliver new gas production in significant quantities and cause irreversible harm to some of our nation's most environmentally sensitive areas. Increasing supplies by expanding imports of liquefied natural gas (LNG) would make the United States more dependent on some of the same OPEC countries we are now dependent on for oil, and could create significant new security risks for millions of Americans living highly populated areas. By contrast, renewable energy and energy efficiency technologies take advantage of homegrown resources that are in abundant supply and can be deployed quickly. They provide significant environmental benefits compared to drilling, transporting and burning natural gas. And renewable energy and energy efficiency projects begin to reduce demand for natural gas from the moment they are put in service.

Renewable Energy Conserves Natural Gas Supplies

Numerous studies performed in the past several years by EIA and UCS using EIA's National Energy Modeling System (NEMS) show that increasing our use of renewable

[1] Wall Street Journal, February 17, 2004.

energy resources through a national renewable electricity standard (RES) can reduce demand for natural gas and lower natural gas prices.[2] These analyses show that higher levels of renewable energy generation reduce the demand for natural gas—alleviating potential shortages (See Figure 2 in Appendix). Reaching 10 percent renewable electricity could save as much as 1.4 trillion cubic feet (Tcf) compared to business as usual in 2020. Achieving 20 percent renewable electricity by 2020 could increase the natural gas savings to as much as 3.8 Tcf.

In March 2004, UCS examined a 10 percent by 2020 and 20 percent by 2020 national RES using the *Annual Energy Outlook 2004* version of NEMS and EIA's assumptions. This analysis shows that under the 10 percent RES, renewable energy could save as much as 0.5 Tcf per year compared to business as usual in 2020, and 5.1 Tcf cumulatively from 2005-2025. Achieving 20 percent renewable electricity by 2020 could increase the natural gas savings to 1.8 Tcf per year (20.6 Tcf cumulatively)—equal to six percent of total projected 2020 gas use, or more than one-third of the natural gas consumed by U.S. households today (See Figure 3 in Appendix).[3]

The EIA uses higher cost and worse performance assumptions for most renewable energy technologies compared with recent experience and projections by the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy, and National Renewable Energy Laboratory. With the exception of the March 2004 analysis, our results use a modified version of NEMS with renewable energy costs and assumptions that are more in line with DOE's national laboratories.

Renewable Energy Reduces Natural Gas Prices

Because increased renewable energy use reduces the demand for natural gas, and creates new competitors to traditional power plants, increasing renewable energy would also reduce natural gas prices. The March 2004 UCS analysis found that achieving the 20 percent RES could reduce gas prices by as much as $0.25/million Btu compared to business as usual, resulting in cumulative gas bill savings of $15 billion through 2025.

In a report released this month, the U.S. Department of Energy's Lawrence Berkeley National Laboratory (LBL) evaluated the results from a range of studies on increasing renewable energy and energy efficiency—including those analyses conducted by EIA and UCS—and found that every 1 percent reduction in national natural gas demand from renewable energy and energy efficiency is likely to lead to long-term average reductions in wellhead gas prices of 0.8 to 2 percent.[4] The LBL report goes on to say that the results

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[2] EIA, *Impacts of a 10-Percent Renewable Portfolio Standard,* SR/OIAF/2002-03, February 2002. EIA, *Analysis of a 10-Percent Renewable Portfolio Standard,* SR/OIAF/2003-01, May 2003. EIA, *Analysis of Strategies for Reducing Multiple Emissions from Electric Power Plants: Sulfur Dioxide, Nitrogen Oxides, Carbon Dioxide, and Mercury and a Renewable Portfolio Standard,* SR/OIAF/2001-03, June 2001. UCS, *Renewing America's Economy*, September 2004. UCS, *Renewable Energy Can Help Ease Natural Gas Crunch*, March 2004. UCS, *Renewing Where We Live*, September 2002. UCS, *Renewing Where We Live*, February 2002.

[3] UCS, *Renewable Energy Can Help Ease Natural Gas Crunch*, March 2004.

[4] Lawrence Berkeley National Laboratory, "Easing the Natural Gas Crisis: Reducing Natural Gas Prices through Increased Deployment of Renewable Energy and Energy Efficiency," January, 2005.

from the analyses evaluated are broadly consistent with economic theory, results from other national energy models, and limited empirical evidence.

Renewable Energy Can Reduce Both Electricity and Gas Bills

In addition to lowering natural gas prices, the EIA and UCS studies also found—and the LBL report confirms—that reductions in wellhead prices will lead to lower electricity prices. Lower electricity prices combined with a reduction in natural gas prices result in significant energy bill savings for residential, commercial, and industrial consumers. Past EIA analyses have found that consumers could save money on electricity and gas bills if electric companies met a standard of 10 percent renewable energy by 2020. With EIA's 2004 gas price forecast (see discussion under Issue 8 below), a renewable standard of 20 percent by 2020 would save even more money ($26.6 billion), according to the March 2004 UCS analysis.

The most recent UCS analysis, released in September 2004, also examined the costs and benefits of a 20 percent by 2020 RES using EIA's 2004 gas price forecast, but with renewable energy cost assumptions more in line DOE's national laboratories. The results of this analysis show that consumer energy bill savings could be even greater than with EIA's assumptions. By 2020, the total consumer savings from lower energy prices would be $49.1 billion (See Figure 4 in Appendix). All sectors of the economy would benefit from the 20 percent RES, with commercial, industrial, and residential customers' total savings reaching $19.1 billion, $17.4 billion, and $12.6 billion, respectively.

Renewable Energy Can Provide Additional Benefits

In addition to its effects on the natural gas demand and prices, UCS analysis shows that increasing our use of renewable energy can provide America with substantial additional benefits. For example, renewable energy development would create new high-paying jobs and other economic benefits in the United States. By 2020, the 20 percent RES would create more than 355,000 new jobs in manufacturing, construction, operation, maintenance, and other industries. Renewable energy development would create nearly twice as many jobs as producing the same amount of electricity from fossil fuels—a net increase of nearly 157,500 jobs by 2020. It would also generate an additional $8.2 billion in income and $10.2 billion in gross domestic product in the United States' economy.[5]

A 20 percent RES would also provide a tremendous boost to rural economies. Many of the jobs identified above—including 30,000 new jobs in agriculture—would be created in rural areas where most of the renewable resources and facilities would be located. By 2020, a 20 percent national RES would provide $72.6 billion in new capital investment, $15 billion in payments to farmers and rural areas for producing biomass energy, $5 billion in new property tax revenues for local communities, and $1.2 billion in wind power land lease payments to farmers, ranchers, and rural landowners.[6]

[5] UCS, *Renewing America's Economy*, September 2004.
[6] Results are presented in cumulative net present value 2002$ using a 7 percent real discount rate. Job results are for the year 2020.

Increasing renewable energy use will reduce the amount of air pollution from power plants that threaten people's health by burning coal, oil, and natural gas. Carbon dioxide emissions, which trap heat in the atmosphere and cause global warming, would also be reduced. Nationally, the 20 percent RES will reduce about 434 million metric tons (MMT) of power plant carbon dioxide (CO_2) emissions per year by 2020—reducing the growth in power plant emissions by more than half. The RES will also reduce harmful water and land impacts from extracting, transporting, and using fossil fuels and conserve resources for future generations.

Renewable energy plus energy efficiency provide the greatest benefits

Implementing effective energy efficiency measures can be the fastest and most cost effective approach to balancing gas demand and supply, with renewable energy providing a critical mid-term to long-term supplement. A 2003 study by the American Council for An Energy-Efficient Economy (ACEEE) confirms that modest near-term reductions in gas and electricity consumption through efficiency measures coupled with increased renewable energy use could significantly impact natural gas prices and availability, while saving consumers more than $75 billion on their natural gas bills over the next five years. The model used in ACEEE's analysis also demonstrates that the near-term natural gas price response and consumer savings from increasing energy efficiency and renewable energy could be much greater than projected in EIA's NEMS model.[7]

Barriers to Renewable Energy Development

In spite of these compelling economic, environmental, and security benefits, renewable energy technologies continue to face many market barriers, which unnecessarily keep them from reaching their full potential. The United States still only generates about two percent of its electricity from non-hydro renewable energy sources. Renewable energy technologies have made great strides in reducing costs, thanks to research and development and growth in domestic and global capacity. However, like all emerging technologies, renewable resources face commercialization barriers. They must compete at a disadvantage against the entrenched industries. For example, in some regions of the country, at sites with the best potential, wind power is now cheaper than natural gas or coal-powered electric generation facilities. Often though, investments in these least cost options are still not being made by electric utilities and energy developers. Many renewable energy developers are also finding it difficult to secure the long-term commitments that are necessary to finance their projects.

Renewable energy technologies face distortions in tax and spending policy. Studies have established that federal and state tax and spending policies tend to favor fossil-fuel technologies over renewable energy.[8] Conventional generating technologies also tend to have a lower tax burden. Fuel expenditures can be deducted from taxable income, but few

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[7] American Council for an Energy-Efficient Economy. *Natural Gas Price Effects of Energy Efficiency and Renewable Energy Practices and Policies*. December 2003.

[8] Doug Koplow and John Dernbach, "Federal Fossil Fuel Subsidies And Greenhouse Gas Emissions: A Case Study of Increasing Transparency for Fiscal Policy," Annual Review of Energy and Environment, 2001. 26:361–89. Goldberg, Marshall, *Federal Energy Subsidies: Not All Technologies are Created Equal*, Renewable Energy Policy Project, July 2000.

renewable energy technologies benefit from this deduction, since most do not use fuels. Income and property taxes are often higher for renewable energy, which require large capital investments but have low fuel and operating expenses.

Many of the benefits of renewable resources—such as reduced pollution and greater energy diversity—are also not reflected in market prices, thus eliminating much of the incentive for consumers to switch to these technologies. Important additional market barriers to renewable resources include: lack of information by customers, institutional barriers, the small size and high transaction costs of many renewable technologies, high financing costs, split incentives among those who make energy decisions and those who bear the costs, and high transmission costs.

Policy Recommendations

UCS believes that a national renewable electricity standard is the cornerstone of any comprehensive policy approach to overcome market barriers and stimulate large-scale renewable energy development. A national RES can diversify our energy supply with clean, domestic resources. It will help reduce natural gas demand and prices, and provide a host of other economic, environmental, and security benefits. For these reasons, we believe a national RES should be included in any Congressional legislation that addresses natural gas supply and demand issues.

Eighteen states and the District of Columbia have enacted minimum renewable energy requirements. While many of these state standards have been enacted too recently to fully evaluate their effectiveness, a number of studies have found that renewable electricity standards are and will continue to be the primary driver of new renewable energy generation in the United States. Two-thirds of the wind development installed between 1998 and 2003 (3,300 MW) occurred in states that have an RES. But energy production creates national economic and environmental problems that need national solutions. States are demonstrating that renewable electricity standards can be effective and are an excellent start, but a national RES is necessary to satisfy the goal of reducing natural gas demand and prices for the entire country.

Additional recommendations for policies that support renewable energy and energy efficiency in an effort to address to our growing natural gas supply problems can be found in the next section.

Issue 6 - Tax Incentives. Could tax incentives help increase supply and/or reduce demand of natural gas?

Tax incentives for energy efficiency and renewable energy could play an important role in reducing the demand for natural gas, when combined with standards and other market-oriented policies. A 2001 UCS study called *Clean Energy Blueprint* found that a suite of national policies to increase energy efficiency and renewable energy could reduce U.S. natural gas use by 31 percent and average natural gas prices by 27 percent below business as usual levels in 2020.[9]

Lower natural gas use and prices would allow households and businesses that use natural gas for heating and industrial processes to save nearly $30 billion per year on their gas bills by 2020 under the Clean Energy Blueprint. A typical household that heats with natural gas (using 850 therms per year) would save $200 per year by 2020. The savings would likely be greater than this, as we used EIA's low natural gas price forecast from 2001 in this analysis (see more under #8 below). Conserving natural gas supplies would also reduce the need for hundreds of thousands of miles of new natural gas pipelines.

The Clean Energy Blueprint evaluated the impacts of several tax incentive policies for increasing energy efficiency and renewable energy use that merit consideration by the Senate Energy and Natural Resources Committee. These include:

- Extending the federal production tax credit for renewable energy technologies to provide greater tax parity with fossil fuel technologies. The current credit is set to expire at the end of 2005. A permanent extension of the PTC is needed to provide greater market certainty to renewable energy businesses, utilities, and the financial community, while creating new high-tech manufacturing jobs in the United States. Tax incentives are also needed to encourage consumer investments in renewable energy technologies, such solar photovoltaics, wind turbines, and anaerobic digestors.
- A 10 percent investment tax credit (or a shortened depreciation period of 7 years for industrial systems and 10 years for building systems) for combined heat and power systems achieving efficiency improvements of 60 to 70 percent, depending on the size of the system. These incentives should be implemented along with fair interconnection standards, a standard permitting process, and accurate environmental standards that recognize the efficiency gains of CHP systems.
- Up to $2,500 for new houses that demonstrate 50 percent reductions in space heating and cooling costs compared to homes that meet the current Model Energy Code.
- $50-$100 for manufacturers of high-efficiency refrigerators and clothes washers.
- A 20 percent investment tax credit for new high efficiency building technologies, including air conditioners, heat pumps, stationary fuel cell power systems, and furnaces.

[9] UCS, *Clean Energy Blueprint: A Smarter National Energy Policy for Today and the Future*, October 2001.

- A $2.25 per square foot deduction for commercial building and multifamily residential investments that result in at least 50 percent reductions in heat and cooling costs below the current ASHRAE model energy standards.
- Incentives to encourage industry to reduce energy use by 1-2 percent annually.

In addition to these policies, the Clean Energy Blueprint evaluated the impacts of a national renewable electricity standard of 20 percent 2020, a public benefits fund for efficiency and renewable investments, net metering, increased research and development funding, and enhanced building codes and appliance efficiency standards. We found that implementing this package of clean energy policies would save consumers $440 billion on their energy bills by 2020, while reducing power plant carbon dioxide emissions by two-thirds.

Issue 8 - FERC and EIA Natural Gas Market Data. Is storage and market information adequate to ensure well-functioning natural gas markets?

EIA has consistently underestimated natural gas prices over the past decade. EIA has increased its 20-year natural gas price projection, as published in *Annual Energy Outlook* (AEO), each of the last nine years to conform to new data (See Figure 5 in Appendix). EIA and other state and federal agencies regularly use these forecasts to evaluate the costs and benefits of proposed energy policies. Companies also use EIA projections to evaluate long-term investment and technology decisions. Credible and accurate projections are essential to making sound policy and investment decisions.

Low natural gas prices make investments in energy efficiency and renewable energy appear more expensive than they really are. For example, a 2001 EIA analysis projected that a national renewable electricity standard of 20 percent by 2020 consumers would cost consumers $14 billion on their energy bills by 2020. By comparison, a 2004 UCS analysis of a 20 percent standard using EIA's assumptions and model projected that consumers would save nearly $27 billion on total energy bills by 2020. EIA has changed a number of its assumptions between 2001 and 2004, however, most of the difference in energy bill savings is due to changes in natural gas prices.

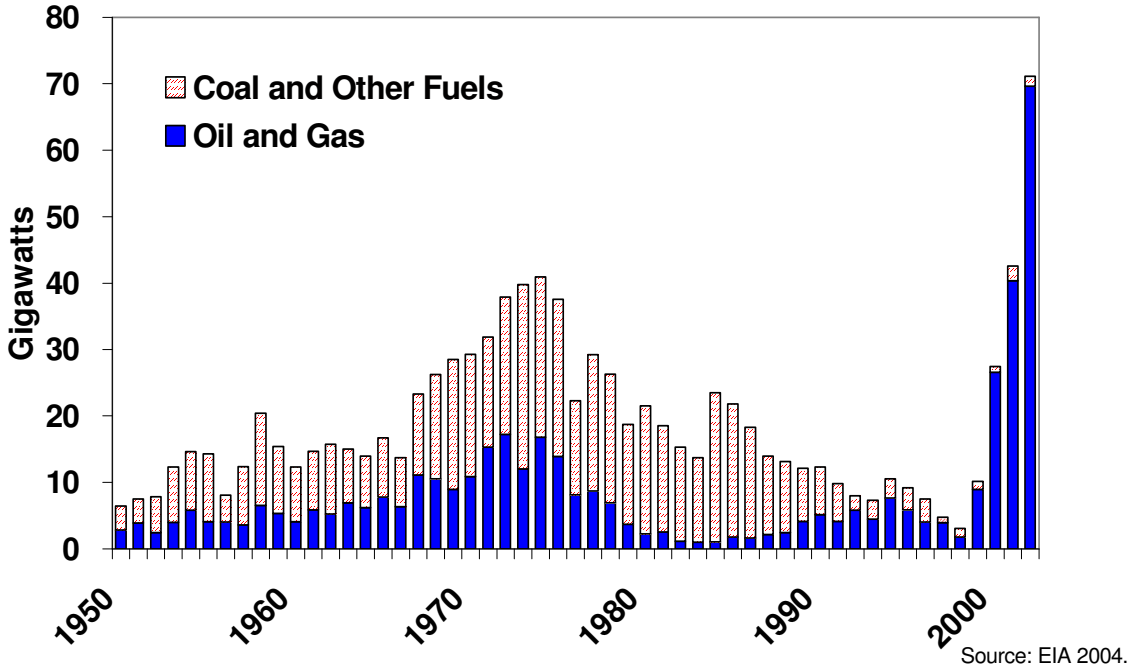
While EIA has steadily increased its long-term gas forecasts, it's most recent projection in *Annual Energy Outlook 2005* (released in December 2004) is still well below where NYMEX natural gas futures contracts were trading at the time EIA finalized its gas price forecast. According to a recent analysis by Lawrence Berkeley National Lab, NYMEX futures prices are $1.11 per million Btu higher than the AEO 2005 reference case over the next six years.[10] This is the largest spread between EIA and the futures market they have seen over the past five years. They go on to say that one would have to pay this premium "in order to lock in natural gas prices over the coming six years to replicate the price stability provided intrinsically by fixed-price renewable generation. Fixed-price renewables obviously need not bear this added cost, and moreover can provide price stability for terms well in excess of six years."

Thus, EIA's projections continued to be biased in favor of natural gas generation and against renewable energy and other competing technologies. We recommend completing a thorough and independent review of EIA's natural gas forecasting methodology and assumptions and making necessary revisions to better calibrate their forecasts with market data.

[10] Mark Bolinger and Ryan Wiser, Berkeley Lab, "Comparison of AEO 2005 Natural Gas Price Forecast to NYMEX Futures Prices," Memorandum, December 13, 2004.

Appendix

Figure 1. Annual Additions to Electric Generation Capacity by Fuel, 1950-2002



Source: EIA 2004.

Figure 2. Renewable Energy Can Save Natural Gas (2020)

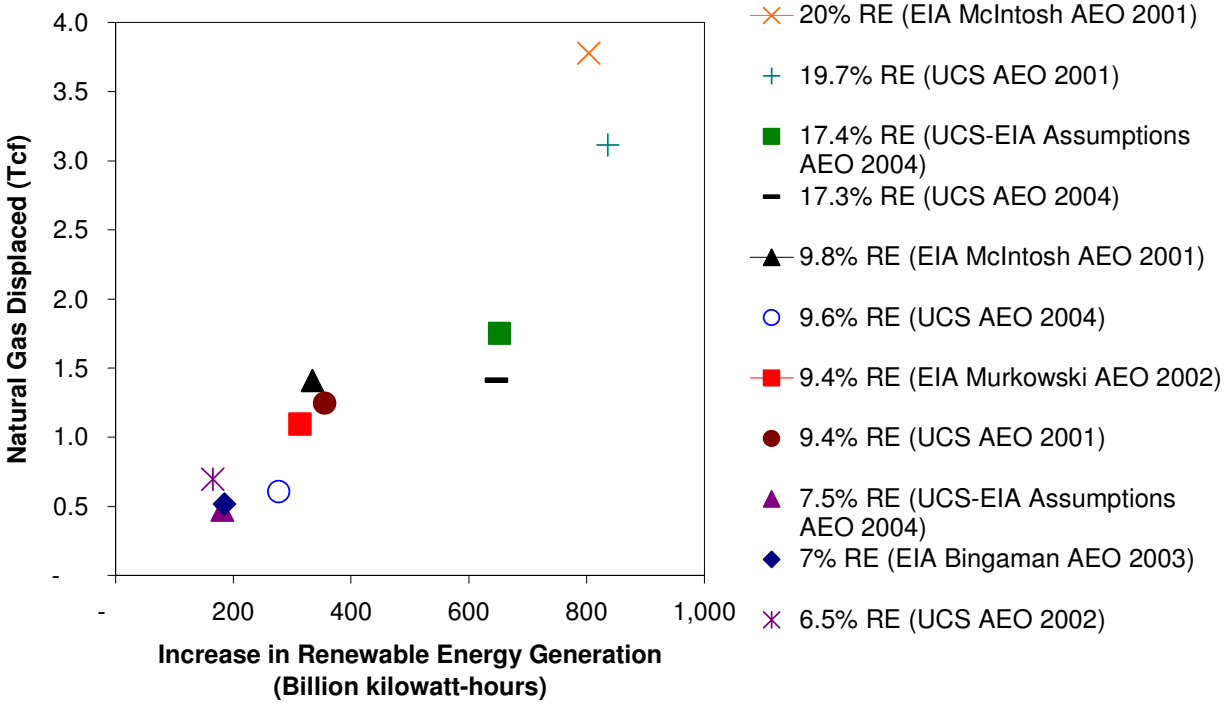
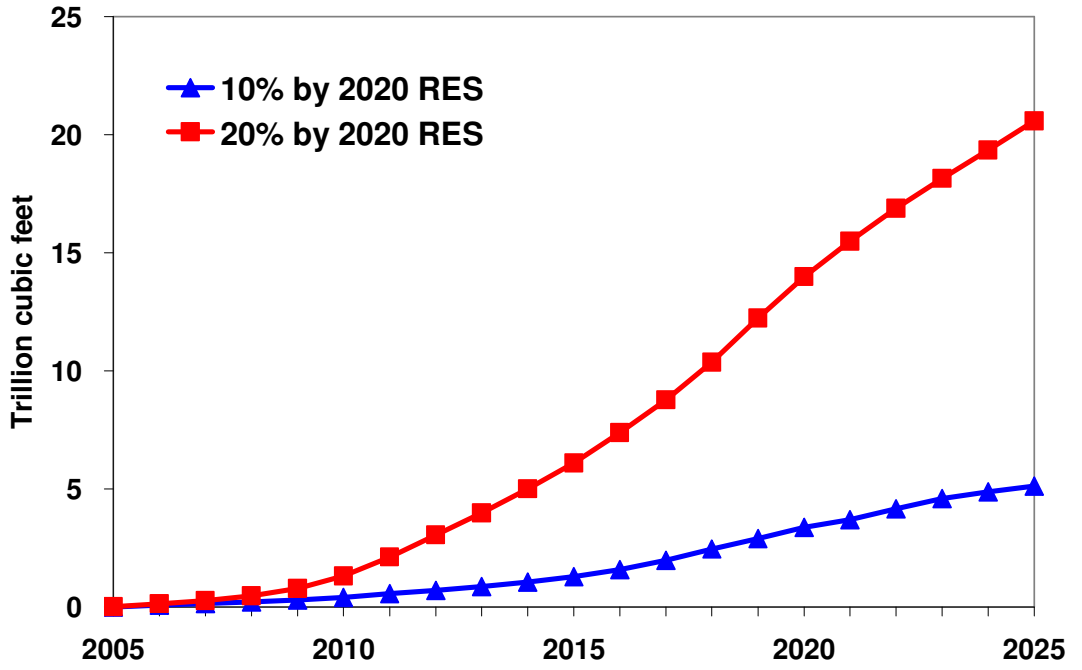
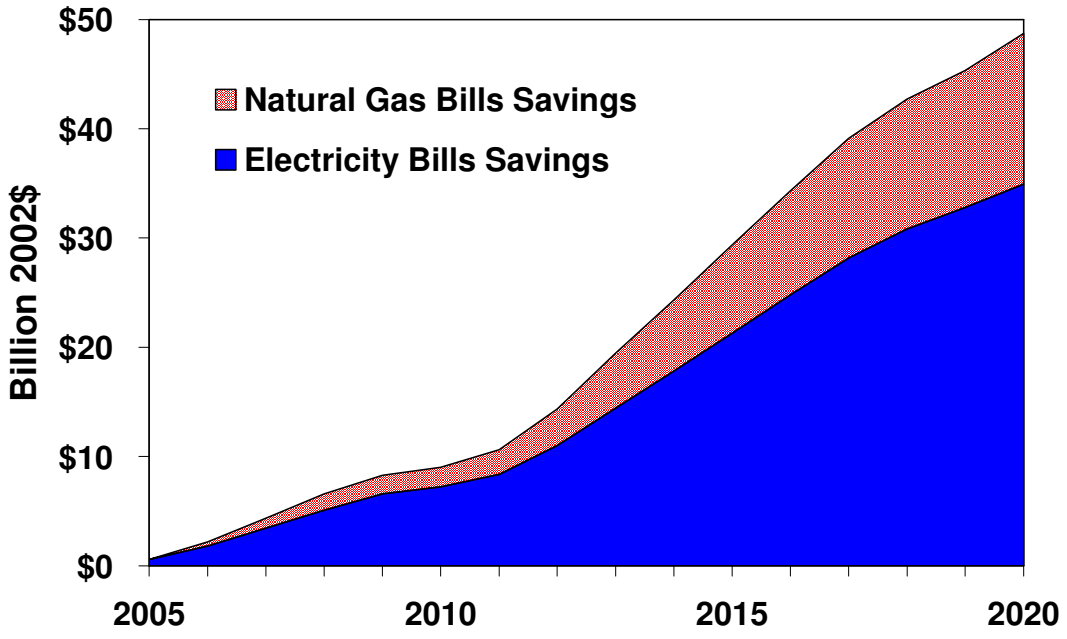


Figure 3. Cumulative Natural Gas Savings



Source: UCS, March 2004.

Figure 4. Cumulative Natural Gas and Electricity Bill Savings (20 percent by 2020 RES)[a]



[a]Excludes transportation.
Source: UCS, September 2004.

Figure 5. EIA Annual Energy Outlook Wellhead Natural Gas Prices (2002$/Mcf)