

## Ending the Natural Gas Crisis: The Critical Role of Efficiency and Renewables

For the past three years, natural gas and home heating costs have taken Colorado's residents and businesses on a roller-coaster ride. Over the next three years, we're unlikely to see prices drop to anywhere near their previous levels.

The easiest way to protect consumers from high gas prices is to reduce gas demand through investments in efficiency and renewable energy. Reducing natural gas use in our homes, businesses, and power plants is the best way to lower gas bills—this winter and for years to come. This paper reviews the natural gas situation and explains what should be done to improve energy efficiency and increase renewable energy use as part of any comprehensive approach to easing our long-term natural gas problem.

### Some Background on Natural Gas

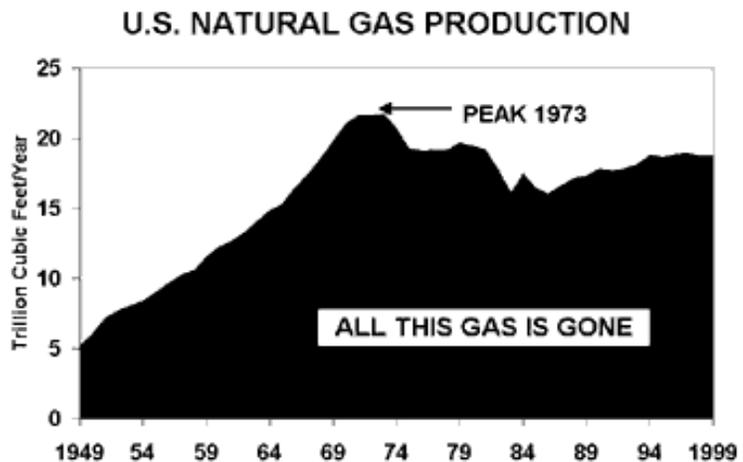
For the past decade, natural gas has been the preferred fuel for new electric power generation plants. It burns more cleanly and more efficiently than coal. It is safer and far less expensive than nuclear power, and, as a domestically produced fuel, offered a degree of energy independence. Until the late 1990s, natural gas was also an inexpensive fuel. North American gas supplies seemed plentiful, keeping prices relatively low—generally less than \$2 per thousand cubic feet at the wellhead.

Because of these factors, demand for natural gas for electricity generation has grown rapidly. The U.S. used nearly 5.6 trillion cubic feet of natural gas for power generation in 2002, up from 3.5 trillion cubic feet a decade earlier. In fact, more gas is used for electricity production today than is used for heating, cooking and other end uses in all the homes in America. (U.S. Energy Information Administration, U.S. Total Natural Gas Consumption by End Use; [www.eia.doe.gov](http://www.eia.doe.gov))

Recently, however, the laws of supply and demand have caught up with us. As older gas wells run dry, new wells are extracting gas at astonishingly rapid rates, putting us on a steepening treadmill of

depletion. New gas reserves in the Rockies aren't as large as the giant, aging gas fields in Canada, Texas and Louisiana, and can't produce enough gas to keep up with current and projected demand. As a result, natural gas imports from Canada have climbed for a decade and imports of liquefied natural gas are expected to soar.

The bottom line: natural gas prices have risen and are staying high. Earlier this summer, gas prices reached double the cost last year, and are expected to remain high this winter. Consumers in Colorado and other states are likely to face substantially higher heating and electric bills this winter.



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The rising cost of natural gas creates a dilemma for electricity producers: the factors that made gas the fuel of choice—it was clean, safe and cheap—still make it difficult to switch electricity generation back to dirty or dangerous fuel sources. But the notion that electricity consumers face either whopping natural gas bills, more pollution from coal, or heightened costs and safety threats from nuclear power is a false choice. Energy conservation—using both gas and electricity more efficiently—and increased electricity production from renewable energy sources can help consumers and businesses lower their energy bills.

**Natural Gas Supply: We Can't Drill Our Way Out Of This**

While there have been conflicting reports about the severity of our current gas “crisis,” the uncertainty underscores the main drawback of natural gas—it is a finite resource. While gas prices might not reach predicted highs in the coming months, several factors will keep prices from returning to historic lows.

- The best, most easily accessible gas fields in North America have already been drilled. As these fields tap out, each well becomes less productive. The only way to keep pace with demand is to extract the gas faster and drill more wells. (‘Methane Madness,’ Community Office for Resource Efficiency, 2001)
- Streamlining environmental reviews and increasing access to federal natural gas resources on public lands in the Rockies would increase supplies by less than one percent, provide no immediate price relief, and save the average U.S. household about \$5 a year by 2020. (U.S. Energy Information Administration, 2001, U.S. Natural Gas Markets: Mid-Term Prospects for Natural Gas Supply, SR/OIAF/2001-06, and EIA 1997, A Look at Residential Energy Consumption in 1997; EIA 2001 study sought to determine net benefits of relaxing environmental regulations for natural gas projects. Using EIA data contained in these reports, Dr. Peter Morton found that relaxed regulations would result in average of \$5 annual savings for residential gas consumers.)
- Natural gas has become more expensive and difficult to find in North America in recent years, because many fields are already fully developed, and areas that have remained untapped tend to be expensive to drill (e.g., deep reservoirs in the Gulf of Mexico’s outer continental shelf) and/or lie in wilderness or public lands that provide other important public benefits.
- The gas industry has drilled more than 50,000 new gas wells in the U.S. in the past four years, but total domestic gas production has remained flat. Meanwhile, gas price volatility has continued. (U.S. Energy Information Administration, Annual Energy Review; Annual Gas Review; Monthly Energy Review, at [www.eia.doe.gov](http://www.eia.doe.gov))
- Due to high gas prices, the major gas-containing basins of the Rocky Mountain states are experiencing a dramatic surge in drilling activity, as production companies rush to

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**“There is virtually nothing that can be done to increase the supply of natural gas.”** Harold Kvisle, president and chief executive officer, TransCanada Corp., testimony to U.S. House Energy & Commerce Committee, June 11, 2003

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capitalize on prices more than twice their historic norm. This suggests that the slow-down in gas drilling nationwide and in the Rockies is due in large part to issues of profitability—not “red tape” and environmental regulations.

- The current drilling boom is unlikely to raise nationwide gas supplies to last year’s level of gas production. Shortages of both skilled labor and equipment suggest that the drilling boom can’t expand much further. ([www.eia.doe.gov](http://www.eia.doe.gov))
- While natural gas storage levels have increased for the coming winter, this is because of reduced demand due to mild summer temperatures -- the luck of “weather roulette” -- rather than because of new supplies. Gas-intensive industries have also reduced overall demand by improving the efficiency of their operations.
- Natural gas imports may not be able to provide relief. Canada is the main source of U.S. gas imports, but Canadian gas producers are starting to confront their own resource limits. Canadian gas production is projected to decline in 2003. (“Canadian gas production can’t keep up with U.S. demand,” *Toronto Globe & Mail*, June 11, 2003; “Canada Is Losing Ability to Fill U.S. Natural Gas Needs,” *New York Times*, June 26, 2003)
- Expanding liquefied natural gas (LNG) facilities will enable increased gas imports from overseas, but this is expensive, time-consuming, and controversial.
- Increased LNG imports will not lead to lower gas prices in the near future.

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### Why Gas-Fired Electric Plants Exacerbate the Problem

Natural gas has been the fuel of choice for most new power plants in the U.S. in recent years, and many new gas-fired power plants are either under construction or in planning stages. The use of gas to generate electricity fluctuates with the weather: for example, warm temperatures lead to widespread use of air conditioning, which increases power demand.

- The U.S. Energy Information Administration, in its Annual Energy Outlook for 2002 projects that the share of electric generation from natural gas will double from 16% to 32% by 2020 nationwide. If these projections prove accurate, upward pressure on gas prices will continue. ([www.eia.doe.gov](http://www.eia.doe.gov))
- Since the beginning of 2000, over 21,000 MW of generation, nearly all of it gas, has come online in the West, and another 8,000 MW will be under construction by 2005. (Overview of Current Energy Infrastructure, presentation by Jeff Wright, Office of Energy Projects, Federal Energy Regulatory Commission, Western Energy Infrastructure Conference, Denver, July 30 2003)

**In Colorado, the use of natural gas to generate electricity has more than quadrupled over the past decade.** ([www.eia.doe.gov](http://www.eia.doe.gov))

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**The Fast Route to Big Savings: Energy Efficiency**

Taking steps to use energy efficiently is the fastest, most economical way to reduce energy bills. The energy saved with conservation measures puts money in the pockets of all Coloradoans, stimulating the economy and boosting savings. Unlike gas prices, which follow a roller-coaster track of volatility, investments in energy efficiency have a one-time, fixed cost—and the results show when you open your monthly bill.

- Over the last three decades, the efficiency of natural gas use in the residential sector underwent a virtual revolution. In the early 1970s, the U.S. consumed 5 trillion cubic feet (Tcf) for space heating, water heating and cooking in 35 million homes. ([www.eia.doe.gov](http://www.eia.doe.gov))
- In 2002, using the same 5 Tcf of natural gas, the U.S. heated 58 million homes. That's 68% more homes, with the same amount of natural gas. ([www.eia.doe.gov](http://www.eia.doe.gov))
- Improvements in energy efficiency allowed this to happen—more insulation in our walls and attics, better windows, more efficient furnaces and water heaters, showerheads and faucets that waste less water, and other home improvements.
- Hundreds of thousands of existing homes in Colorado could still benefit from energy efficiency upgrades. (“The New Motherlode,” Southwest Energy Efficiency Project, November 2002)
- Most households and businesses can reduce their natural gas use by 20% or more through the adoption of practical, cost-effective efficiency measures such as higher efficiency furnaces and water heaters, better building insulation, better windows, programmable thermostats, and sealing leaky buildings and air ducts. (“The New Motherlode”)
- Gas conservation programs help consumers and businesses reduce their gas use and gas bills, and also put downward pressure on natural gas prices. Gas conservation programs can deliver results quickly, unlike new investments in gas supply infrastructure which take years to complete.
- Major natural gas utilities in at least nine states (CA, CT, MA, MN, NJ, OR, VT, WA, and WI) sponsor gas conservation programs for their customers. These programs include financial incentives, such as rebates for purchase of energy-efficient devices like high efficiency gas furnaces and water heaters, home retrofit measures, and programmable thermostats; subsidies to pay a portion of the cost of energy audits; and in some cases,

**In 2002, thanks to improvements in energy efficiency, 58 million U.S. homes use the same amount of natural gas as 35 million homes did in the early 1970s.** ([www.eia.doe.gov](http://www.eia.doe.gov))

**"The permanent energy-efficiency efforts that are being put in each year is the equivalent of building power plants."** (S. David Freeman, Chairman, California Power Authority, May 27, 2003)

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free distribution of low-cost energy efficiency measures. (ACEEE: America's Best, (York and Kushler, 2003))

- Most Colorado utility customers--an estimated 90%--do not have access to any utility-sponsored incentives for promoting better home insulation, more efficient furnaces, boilers, and water heaters, and other measures that conserve gas.
- Xcel Energy operates well-funded, effective gas conservation programs in Minnesota, and should be able transfer this know-how to Colorado relatively quickly. Xcel and other utilities should expand both gas and electricity conservation programs in Colorado. Cutting electricity use also will lower natural gas use for power generation, while saving consumers and businesses money on their electric bills.
- Efficiency measures yielding a gas savings of just 1 percent in our homes, commercial buildings, and industries would save approximately 2.5 billion cubic feet of gas per year, saving Colorado's consumers and businesses around \$20 million a year. The energy bill savings would reach \$100 million per year by realizing 5 percent savings after a five-year conversion effort. ("The New Motherlode")

### Clean Power at Competitive Prices: Renewable Energy

According to the Renewable Energy Atlas of the West (see [www.energyatlas.org](http://www.energyatlas.org)), there are sufficient wind resources in Colorado to provide over 16 times the electricity currently consumed in the state. Colorado could reduce its demand for new natural gas for power generation—which constitutes 10 percent of the state's gas consumption—by developing some of its wind energy resources. In doing so, the state could secure some real economic benefits for rural areas while stabilizing rates for all consumers and businesses.

Colorado also has tremendous solar resources that can provide energy when utilities need it the most – during peak times to meet the load created by air conditioners. The Colorado legislature will be debating a bill in the upcoming session that calls for at least 900 megawatts of new generation to come from renewables by 2010. This is expected to reduce rates across the board.

**Renewable energy technologies promote power price stability by avoiding the risks associated with underlying natural gas price escalation, volatility, and delivery.**

(Brandon Owens, Platts Research & Consulting)

- Wind power is now cost-competitive with natural gas. Current contracts for utility scale wind energy range from 2.5 to 3.2 cents per kWh with a downward trend. Advanced natural gas generation costs are projected by the Energy Information Administration to be 4 to 5 cents per kWh based upon gas costs well below current levels. Natural gas costs represent over 60% of the end cost of the electricity it produces. (2.5¢ figure based on data filed in Oklahoma Corporation Commission Case No. PUD 200300363; 3.2¢ figure from Lamar Wind Case in Colorado PUC Decision No. 01-295. EIA Annual Energy Outlook 2003 estimates combined cycle natural gas generation costs of 4.87¢ for 2010, in 2001 dollars)
- Wind and solar energy have no fuel costs, and provide a stabilizing effect on retail electricity rates.

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- By Xcel’s own estimates, a 162-megawatt wind farm scheduled for construction near Lamar will save customers \$4.6 million in a single year. (Testimony of Mr. Ron Darnell, Director, Pricing and Planning, Xcel Energy, June 2003, Federal Energy Regulatory Commission)
- In Oklahoma, industrial customers are clamoring to get a wind project into their electricity mix to reduce and stabilize their electricity costs. (Testimony of Douglas Burton, Oklahoma Industrial Energy Consumers Group, Oklahoma Corporation Commission Cause No. PUD 200300363, July 2003)
- Utilities that do not take into account potential future carbon regulation run the risk of higher costs that will be passed on to businesses and consumers. “While the Bush administration has rejected the Kyoto Protocol, it would be unrealistic to believe that electric generation will not eventually be affected by a greenhouse gas emissions initiative, likely modeled on the SO<sub>2</sub> trading program under the acid rain provisions of the Clean Air Act.” (Public Utilities Fortnightly, February 15, 2003)
- A Renewable Energy Standard (RES) adds diversity to a state’s energy mix, reducing the market power of natural gas providers and increasing competition in the marketplace.
- A 900 megawatt RES in Colorado would save between 3 and 4 billion cubic feet of gas, enough gas to heat 46,000 homes for a year. (Western Resource Advocates, Southwest Energy Efficiency Project)
- A similar renewable standard in Texas resulted in a "wind rush," where renewables targets for 2005 were exceeded by 1999.

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**Stoking Colorado’s Wind Rush**

Colorado, too, could be poised for its own wind rush. Because the state is so richly endowed with accessible wind, it could easily develop into one of the strongest renewables markets in the country.

Unlike the previous rushes the state has experienced—gold, silver, copper, oil, natural gas, and coalbed methane— the wind resource will never be depleted. In this state, the wind could power homes and businesses, supplying jobs, royalties, and tax revenues, for generations without end.

In sum, both energy efficiency and renewable resources offer enormous potential to counterbalance high natural gas prices. In addition to their very real economic benefits, efficiency and renewables do not contribute to air pollution. Unlike fossil fuels, they have minimal impacts on water use. They do not require that we invade sensitive public lands and wilderness areas with gas wells, pumping stations, and pipelines, or eliminate critical air and water quality protections to get drilling permits approved. It only makes sense that we boost energy efficiency and renewable energy efforts in Colorado.

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