

# GAS GUSHER

The nation is awash in natural gas, driving down prices and giving the economy a boost.

BY GLEN ANDERSEN

**W**hat a difference a few years can make. Not long ago, high natural gas prices and tight supplies drove the construction of numerous liquefied natural gas terminals to handle imported fuel. Now, these terminals are seen as a means to export a newfound wealth of natural gas.

Innovative drilling technologies are providing the nation with an astounding increase in energy resources, driving economic development and lowering energy costs for industries, businesses and consumers across the nation.

“The long-term vision for natural gas resources is extremely positive,” says Christopher McGill from the American Gas Association.

New technology has vastly expanded the amount of natural gas the industry thinks can be recovered, increasing from an estimated 1,200 trillion cubic feet in 1990 to current estimates of about 2,170 trillion cubic feet. The change is “due primarily to changes in the economics of natural gas development and extraction technologies,” McGill says.

The refinement of hydraulic fracturing as a method to extract natural gas from shale is a key reason for this boom, although it brings with it environmental concerns and challenges.

Abundant supply has driven natural gas prices to nearly \$2.50 per million Btu. Just a few years ago, prices hovered above \$9, even hitting a high of \$14 for a short time in 2008. At that time, electricity suppliers were concerned about the volatility of gas prices. Many turned to less expensive, more predictable options, such as coal.

Now, with natural gas flooding the market, the U.S. Energy Information Administration forecasts low prices for the next few decades, with enough domestic supply to last about 90 years at current consumption levels.

The nation currently uses about 24 trillion cubic feet of natural gas a year, mainly for electric generation, and use in homes and businesses.

Shale gas—natural gas extracted from shale rock formations—now makes up nearly a quarter of all U.S. natural gas produced and is expected to contribute about half the production by 2035. That will more than compensate for the decline of natural gas produced from traditional drilling.

Hydraulic fracturing has changed the game so much that the Energy Information Administration expects supplies to grow faster than demand over the next 20 years, allowing the United States to become an overall net exporter of natural gas by 2021, though others question that estimate.

*Glen Andersen directs NCSL's energy program.*

Starting in the 1970s, the nation began building liquefied natural gas terminals to import natural gas. Those now will be used to reach the international market, where natural gas commands a much higher price—\$8 in Europe and \$14 in Asian markets.

In addition to providing welcome relief to consumers and businesses, the change in energy outlook has many states, utilities and industries reevaluating their energy portfolios.

## Electric Industry Changes

Compared with coal, natural gas power plants produce fewer emissions, cost less to build and make it much easier for states to meet EPA air regulations. In 2011, coal was used to generate 39 percent of the nation's electricity, natural gas 26 percent, nuclear energy 22 percent and renewable sources 11 percent, according to the Energy Information Administration.

Recent rules issued by the Environmental Protection Agency are reinforcing the shift from coal to natural gas. The Cross-State Air Pollution Rule, created as a result of court action, would require 28 states in the East and Midwest to reduce power plant emissions that contribute to ozone and particulates. The rule, however, was temporarily halted late last year by a federal appeals court.

For many utilities, it's cheaper to switch to natural gas than to bring older coal plants into compliance. The Mercury and Air Toxics Standard, which requires reduction in mercury emissions, will also add costs to burning coal. The looming possibility of greenhouse gas regulation adds uncertainty to the long-term costs of operating a coal plant as well.

McGill points out that natural gas is already replacing coal on the basis of price, as well as environmental benefits. According to Bentek Energy, natural gas to power generation is up 24 percent a year to date in 2012 compared to the same period in 2011.

Concerns about coal, combined with the low price for natural gas, have spurred a major expansion in its use to generate electricity. Sunbury Generation LP in Pennsylvania is closing five of six coal plants and replacing them with gas. The same scenario is playing out in states from Texas to Colorado to Oregon.

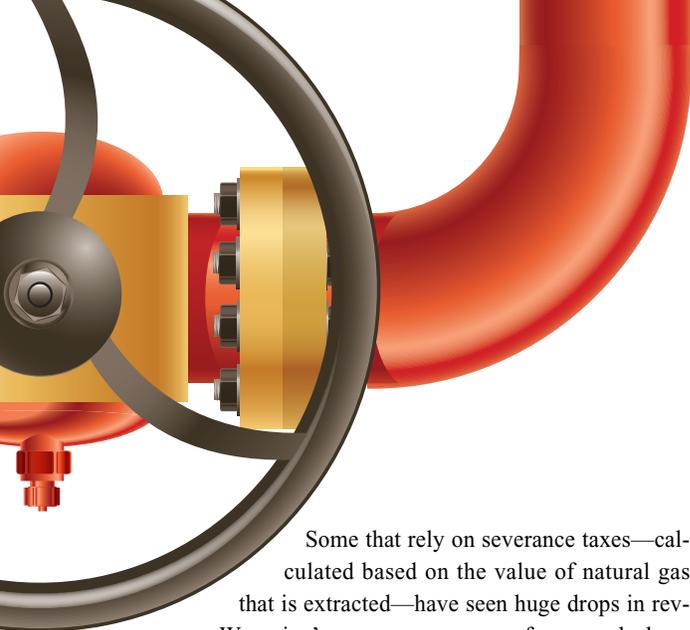
“Gas well drilling activity in the Barnett Shale has brought enormous economic benefit to our community—and helped provide a reliable, cleaner source of energy for Texas,” says Senator Jane Nelson (R). “If our country is going to achieve independence from foreign sources of energy, I believe our state will be leading the way.”



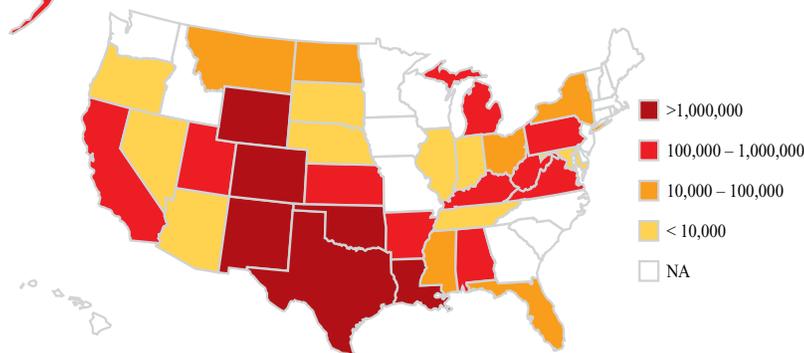
Senator  
Jane Nelson (R)

## Low Prices a Mixed Blessing

The natural gas boom has not benefited all states equally. *Texas*



## Natural Gas Marketed Production, 2010 (million cubic feet)



Some that rely on severance taxes—calculated based on the value of natural gas that is extracted—have seen huge drops in revenue. Wyoming’s severance revenues, for example, have dropped more than a \$100 million a year.

In addition, the low price has natural gas companies, such as Chesapeake Energy Corporation, slowing production and decreasing investment in gas fields.

Cheaper electricity driven by rock-bottom natural gas prices have been a mixed blessing for renewable energy development. Wind and solar energy are variable and require the support of natural gas plants or other generation sources that can adjust quickly to changes in electricity demand. The abundance of natural gas makes it easier to integrate renewable energy resources into the mix in many parts of the country. The same downward pressure on electricity prices has made it more difficult for renewable energy to compete economically.

Even with all this good news about natural gas, some warn it’s not a panacea for the nation’s energy needs. Although natural gas emits 30 percent to 40 percent less carbon dioxide than coal, recent research has shown that methane, a potent greenhouse gas leaked during the drilling process, may counteract some of this benefit. Also, hydraulic fracturing’s potential contamination of drinking water is a major concern in some states.

### Driving Demand

In Colorado, ranked seventh in the nation for natural gas production, growth in natural gas extraction led to legislation that

promotes a shift from coal to natural gas by allowing utilities to recover the cost of the transition.

“We were the first in the nation to pass a clean air-clean jobs bill,” says Senator Judy Solano (D), who authored the bipartisan bill designed to utilize state resources while addressing air quality issues. “We will retire several coal plants and by 2018 will see an 86 percent reduction in oxides of nitrogen and more than 80 percent reduction in mercury and sulfur dioxide. For the metro area to see that reduction in pollution is great benefit to residents.”

With production outstripping demand, many are looking beyond heating and electricity to other uses for natural gas. Cleaner burning and cheaper than gasoline, natural gas is being used more and more to fuel trucks, buses and delivery vehicles. This not only takes advantage of domestic resources, but can revive local industry and improve energy security.

“Natural gas is important because it represents a significant economic engine for the state through the dollars being spent on exploration and development,” says Representative Brian Ellis (R) of Pennsylvania. “It’s also important because it offers the commonwealth a source of homegrown energy, helping us to reduce our dependency on foreign sources.”

Many industries that rely on natural gas—petrochemicals for plastics and other products, fertilizer and steel—are thriving. Examples include a new steel plant in Louisiana, chemical plants near the Gulf Coast, and a new denim plant built by a Brazilian company in Texas to take advantage of low electric rates.

Natural gas prices are expected to rebound eventually, as the economy ramps up, gas-powered electric generation and exports grow, and industries take advantage of this burgeoning resource.

“A diversified portfolio of fuel for electricity generation is critical to mitigate price swings in the energy market and to ensure security in our electricity grid,” says Nelson. “Natural gas is a key component of that mixture, which helps keep energy prices lower for electric customers.”



Senator  
Judy Solano (D)  
Colorado

*“Natural gas is important as it represents a significant economic engine for the state. ... It’s also important because it offers the commonwealth a source of homegrown energy.”*

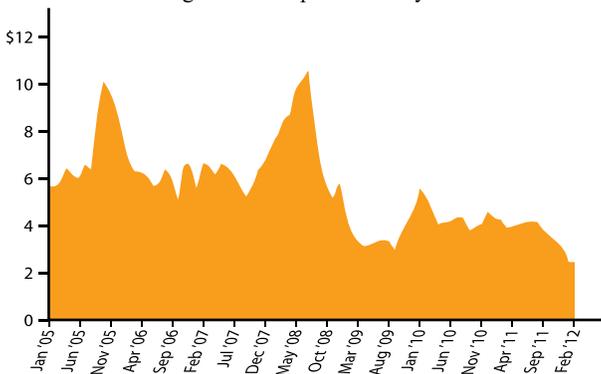
—Representative Brian Ellis (R),  
Pennsylvania.



Representative  
Brian Ellis (R)  
Pennsylvania

### Cost of Natural Gas

The graphic shows the enormous volatility in the price of natural gas over the past several years.



Source: U.S. Energy Information Administration, 2012.

#### SL ONLINE

Learn more about natural gas, severance taxes and hydraulic fracturing at [www.ncsl.org/magazine](http://www.ncsl.org/magazine).

# Fracking Fracas

A new method of extracting natural gas has yielded a bounty of supply, along with health and environmental concerns.

---

BY JACQUELYN PLESS

---

**N**o energy is produced without some consequences. Natural gas is a perfect example. Despite the tremendous economic benefits created by the recent abundance of cheap natural gas, critics are raising alarms about how it's extracted.

Hydraulic fracturing, or "fracking," combined with horizontal drilling, is a leap forward in technology, allowing energy companies to tap into previously inaccessible resources. The technology has opened up reserves that were too expensive to develop just a decade ago. The process pumps millions of gallons of a liquid—usually water mixed with sand and chemicals—underground to force open cracks in the rock so the natural gas can be removed from the shale rock formations.

Rapid expansion of fracking near densely populated areas, however, has shifted focus to its potential effects on public health and the environment.



Assemblyman Kevin Cahill (D) New York

"Natural gas is very important to the well-being of New Yorkers, to our economy and, to an extent, our environment," says Assemblyman Kevin Cahill (D). "While deriving more of our energy from New York sources would certainly serve many public policy goals, it is not something we should advance at all costs and without regard to the environmental threat."

A growing concern is the contamination of drinking water. Some fracking fluids contain hazardous chemicals that, if mismanaged, could spill into groundwater, rivers or streams. Another worry is that fracking requires large amounts of water, which could lead to damage of aquatic habitats or reduce the amount of water available for other uses. Fracking also produces wastewater that must be regulated and treated properly before it is disposed. Treatment and disposal remain a regulatory challenge.

Its effects on air quality and climate change also are concerns. During the drilling process, chemicals such as benzene and

methane are released into the air. In fact, natural gas producers are among the largest methane-emitters in the country, according to the U.S. Environmental Protection Agency. The agency proposed a rule—not yet in effect—in July 2011 to reduce smog-forming chemicals released during oil and gas production.

Wildlife and plants also may be disturbed in the process. Finally, recent rumblings in Ohio and Oklahoma have drawn

attention to a potential link between earthquakes and pumping fracking waste into deep wells.

The natural gas industry supports "state regulation of key environmental challenges," says Christopher B. McGill, managing director of policy analysis for the American Gas Association. The industry would like to see more collaboration between state and federal regulators, he adds.

## Balancing Act

The hydraulic fracturing debate has turned into a balancing act. State legislators and regulators want to protect the environment and public health, but they also recognize the benefits from the revenue the industry brings to state and local economies. A study by IHS Global Insight estimates shale natural gas production generated \$18.6 billion dollars in federal, state and local government taxes and

federal royalty revenues in 2010.

At least 137 bills in 24 states have been introduced that specifically address hydraulic fracturing, and legislation has passed in Indiana, North Carolina, Pennsylvania, South Dakota and Tennessee.

Most of the legislation this year would require better monitoring of chemicals and additives in fracking fluid, stricter disclosure of ingredients, and better monitoring of water withdrawals and waste treatment and disposal.

At least nine states already have some form of disclosure requirement, and 15 states have proposed related legislation this session. In June 2010, Wyoming became the first state to approve rules requiring public disclosure of the chemicals in fracking fluid. Colorado has the most comprehensive rule so far. It requires drillers to disclose not just chemical names, but also their concentrations.

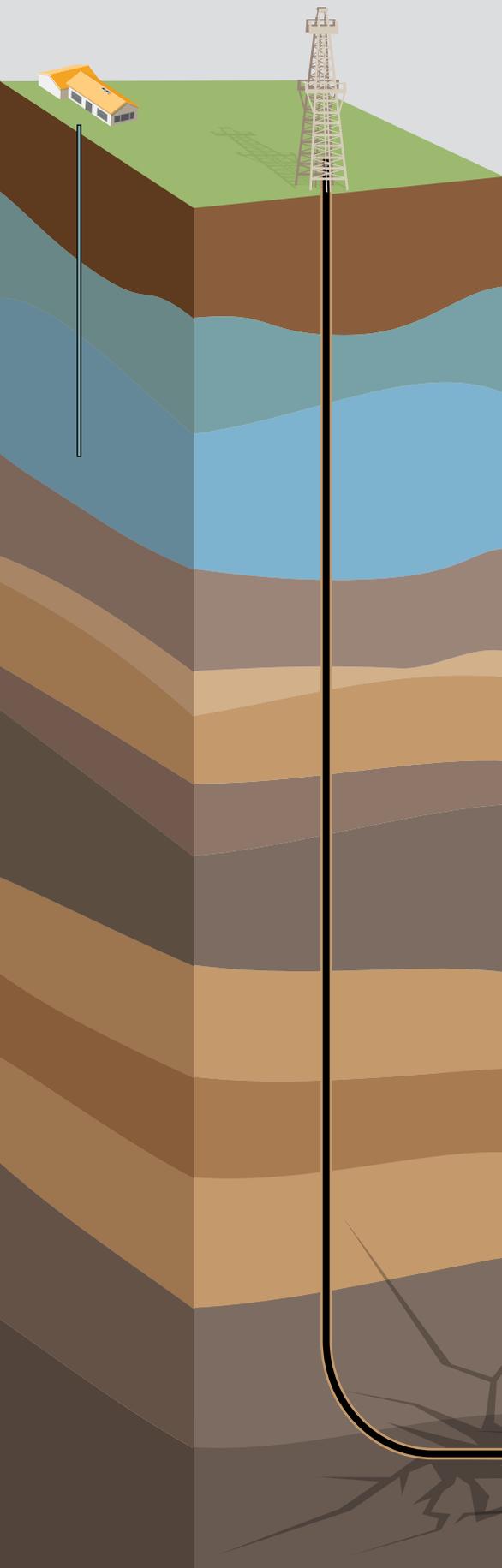
"What I have seen is that the majority of the industry is using best practices and the minority is not," says Colorado Senator

---

*"Natural gas is very important to the well-being of New Yorkers [but] it is not something we should advance at all costs and without regard to the environmental threat."*

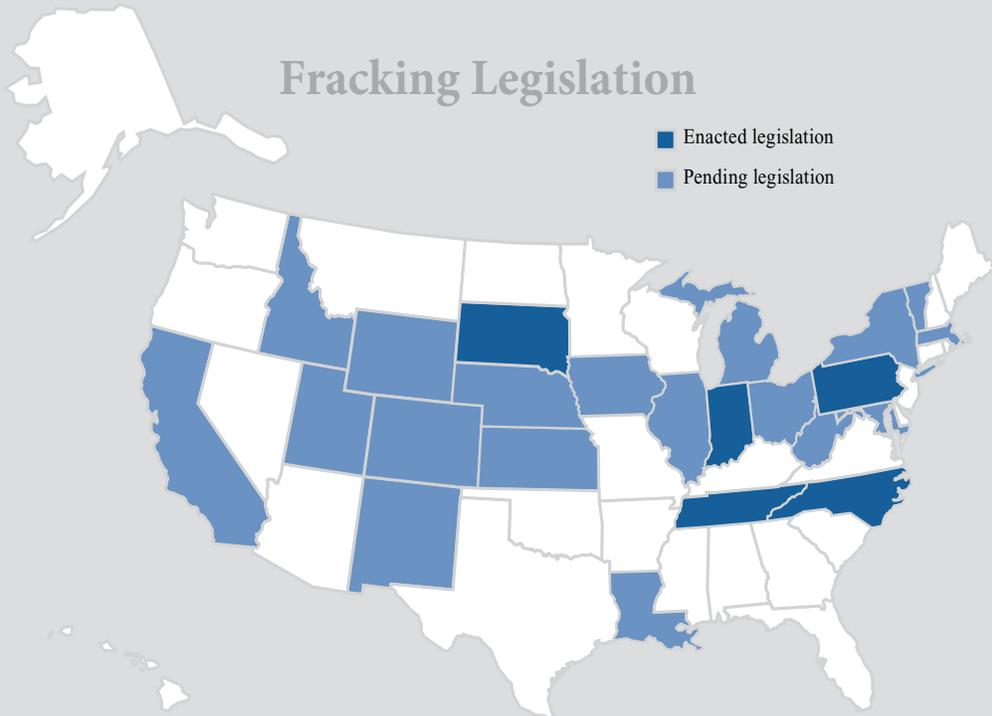
---

—Assemblyman Kevin Cahill (D),  
New York



Natural gas is flooding the U.S. market because of a combination of hydraulic fracturing, or fracking, and horizontal drilling. Fracking involves pumping millions of gallons of a liquid—usually water mixed with sand and chemicals—underground to force open cracks in shale rock so the natural gas can be removed. Teamed with horizontal drilling techniques, it allows energy companies to tap into previously inaccessible resources. State lawmakers are concerned about health and environmental issues raised by hydraulic fracturing, and at least 137 bills in 24 states have been introduced that specifically address fracking.

## Fracking Legislation



## By the Numbers

**90 Years**

Estimated supply of domestic natural gas at current consumption levels

**24 Trillion**

Cubic feet of natural gas used annually in the United States.

**26 percent**

Amount of the nation's electricity generated by natural gas in 2011

**Texas**

Nation's top producer of natural gas.

**11,400**

New wells fractured each year to produce natural gas

**14,000**

Wells re-fractured each year to produce natural gas

**5**

States that have enacted hydraulic fracturing related legislation this session

**24**

States that have introduced legislation addressing hydraulic fracturing

**137**

Bills introduced that address hydraulic fracturing

*“Families in our community have asked that light be shed on the types of substances being injected into the ground. I think that the public’s confidence in hydraulic fracturing will be strengthened simply by lifting the curtain and disclosing this information.”*

—Senator Jane Nelson (R), Texas

Gail Schwartz (D), chair of the Agriculture, Natural Resources & Energy Committee.

“Our new fracking rules are very strong and will require disclosure and transparency we did not have in the past, and encourage industry to move toward best practices,” she says. “I have heard from some health officials that air quality is a concern so we need to make more progress with air quality. Putting these gases into the atmosphere is not a good approach.”

Texas was the first state to enact legislation in 2011. “We passed House Bill 3328 to direct gas well drilling operators to disclose the amount of water and the type of chemicals used in the ‘fracking’ process,” says Texas Senator Jane Nelson (R). “Families in our community have asked that light be shed on the types of substances being injected into the ground. I think that the public’s confidence in hydraulic fracturing will be strengthened simply

by lifting the curtain and disclosing this information.”

McGill says the industry does not have a problem with the regulations and backs “full disclosure of constituents in fracturing fluids. If proprietary information on amounts in mixtures can be protected, then do so. However, transparency and disclosure should be the standard.”

### Generating Revenue

Most natural gas-producing states have some form of severance tax that is imposed on resources removed from the ground and usually is based on the market price of the resource. As a result, revenue generation can fluctuate as the value of natural gas changes.

In 2010, more than \$11 billion was generated from severance taxes alone. In energy-rich states such as Alaska, Mon-

tana, New Mexico, North Dakota, Oklahoma and Wyoming, between 10.5 percent and 74.3 percent of the total state tax revenue came from severance taxes, according to the U.S. Census Bureau.

As of February, 36 states had severance taxes and all but five of them specifically tax oil and gas extraction. Eleven states are considering legislation this year to impose new, or amend existing, oil and gas severance taxes.

Tax structures and revenue allocations vary, but most of the revenue goes into state general funds and is used to pay the costs associated with resource extraction, such as road construction and maintenance, conservation and environmental cleanup. Some money goes to local governments affected by increased drilling. Alaska, New Mexico and Wyoming, for example, reserve a portion of collected taxes for long-term accounts and use the interest to help balance state budgets.

States also can generate revenue with impact and permit fees. Pennsylvania, the largest natural gas-producing state without a severance tax, recently enacted an impact fee, which will go mainly to local communities.

“The legislation provided a way for local governments to address local impacts resulting from natural gas activities,” says Representative Brian Ellis (R) of Pennsylvania. “A majority of the impact fee assessed on well operations goes back to local communities. Second, it provided us an opportunity to update a variety of environmental safeguards, enabling Pennsylvania to keep pace with the advancements in drilling techniques.”

Hydraulic fracturing has transformed the domestic natural gas outlook, but states are moving forward with caution.

“The natural gas in the Marcellus Shale deposit is not going anywhere, so there is no need to rush the process,” says Cahill of New York. “New information is disclosed and uncovered every day. That information should be investigated, considered and synthesized. Meeting a deadline to move forward just for the sake of doing so is simply not prudent.”



Senator  
Gail Schwartz (D)  
Colorado



Senator  
Jane Nelson (R)  
Texas

### SL ONLINE

Read more about steps states have taken to regulate fracking at [www.ncsl.org/magazine](http://www.ncsl.org/magazine).