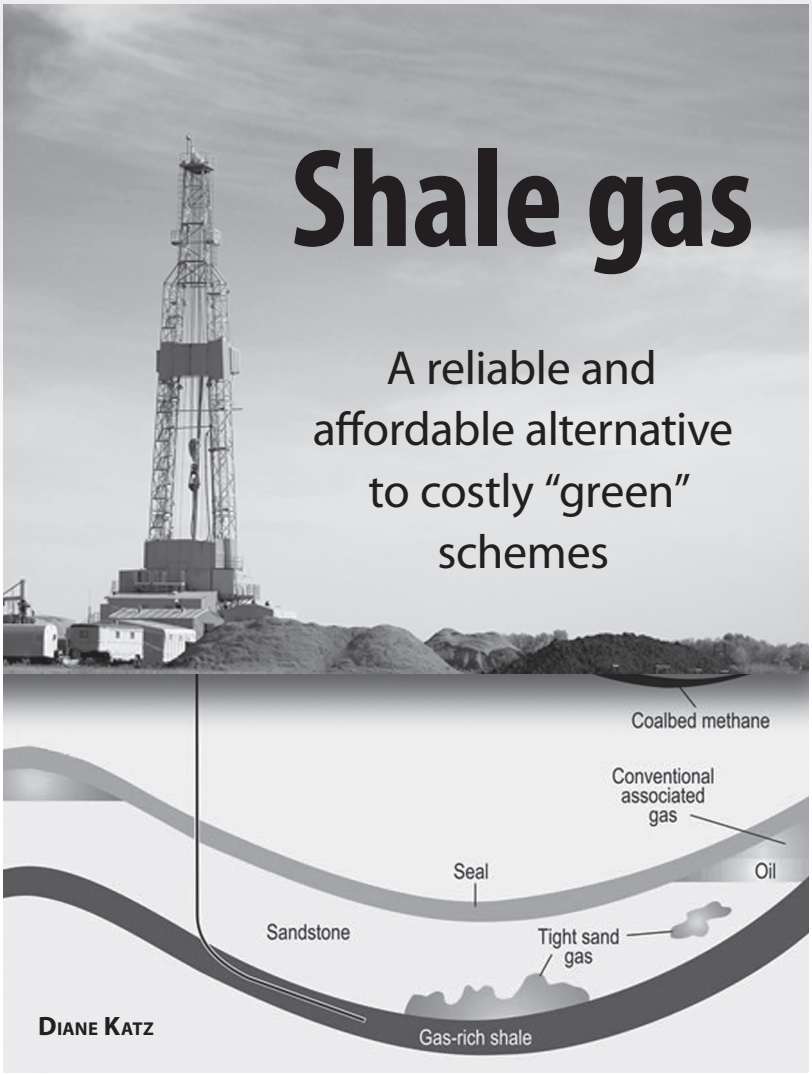

Energy Information Administration; Fotolia

Governments at every level across North America are collectively showering billions of tax dollars on "green energy" schemes in an effort to avert global warming and end our "dependence on foreign oil." But in the political arena, there is precious little attention being paid to a far more affordable alternative energy source with great potential to reduce both fossil fuel emissions and imports of Middle Eastern oil.

In contrast to government tax breaks, preferential loans, grants, and other forms of subsidies to wind and solar projects, private investors are moving capital into the production of "shale gas."[1] Trapped within dense sedimentary rock, this "unconventional"[2] natural gas was for decades considered too costly to retrieve. But advances in drilling technologies, along with the rising cost of conventional natural gas, have transformed the economics of shale gas extraction. Consequently, the vast stores of shale gas buried a thousand metres or more below the surface of North America (and beyond) have the potential to dramatically alter both environmental politics and geopolitics.

The actual volume of recoverable shale gas remains imprecise as supplies are still being mapped and evaluated. The National Energy Board estimates Canada's volume to be 1,000 trillion cubic feet,[3] with similar reserves in the United States (National Energy Board, 2009). Europe also may be home to nearly 200 trillion cubic feet of shale gas (Jaffe, 2010, May 10).

In Canada, there are major shale gas "plays" in the Horn River Basin and the Montney Formation, both in British Columbia. Major exploration for shale gas is also occurring in the Colorado Group in Alberta and Saskatchewan, the Utica Shale in Quebec, and the Horton Bluff Shale in New Brunswick and Nova Scotia (National Energy Board, 2009).

When burned, shale gas emits just half the carbon dioxide of coal (Natural Gas Supply Association, n.d.).[4] Unlike wind and solar power, which produce power intermittently, natural gas is continuously available to produce the steam that powers turbines in the production of electricity. In addition, distribution networks for natural gas already exist, meaning that there is less need to build costly infrastructure.[5] These and other advantages of shale gas call into question the massive public outlays for more problematic "renewable" power sources.

According to energy analyst Amy Myers Jaffe, shale gas "is likely to upend the economics of renewable energy. It may be a lot harder

to persuade people to adopt green power that needs heavy subsidies when there's a cheap, plentiful fuel out there that's a lot cleaner than coal, even if [natural] gas isn't as politically popular as wind or solar" (Jaffe, 2010, May 10).

That very dynamic stymied energy mogul T. Boone Pickens in his plan to build the world's largest wind farm in the Texas Panhandle. The plan called for the construction of a wind farm with 687 turbines, driving the production of 1,000 megawatts of electricity—the equivalent of a nuclear power plant (Souder, 2009, July 6).

Shortly after the debut of the project in 2008, natural gas prices declined, making wind energy not competitive enough to attract the $2 billion needed in financing (Souder, 2009, July 6). As Pickens told the *Dallas Morning News*, "You had them standing in line to finance you when natural gas was $9 [per million Btu] … Natural gas at $4 [per million Btu] doesn't have many people trying to finance you" (Souder, 2009, July 6). The lack of a transmission line to move the wind power to urban centers also contributed to his decision to kill the project, Pickens said (Souder, 2009, July 6).

But governments across Canada have virtually unlimited financing at their disposal in the form of tax revenues, and thus are forcing taxpayers to subsidize costly "renewable" energy projects and transmission build-outs, even though more efficient alternatives exist. The government of Ontario, for example, is forcing utilities (read consumers) to buy "green" power at more than double the market rate for conventional electricity (Ontario Power Authority, 2010).

In the past, the fine grain of shale rock made tapping the natural gas within particularly difficult. The National Energy Board (2009) describes shale as "denser than concrete" and thus virtually impermeable. But from the tenacity of a lone Texan, a productive method to set the gas flowing has emerged. As the *Sunday Times* reports:

> It all began in 1981 when Mitchell Energy & Development, a Texas gas producer, was, quite literally, running out of gas. [George] Mitchell, who founded the firm, ordered his engineers to look into tapping shale, which drillers usually passed through to get to the oil and gas fields below them … For years, [the shale] had been ignored, but Mitchell had a hunch about their potential. "I thought there had to be a way to get at it," he said. "My engineers were always adamant. They would say, 'Mitchell, you're wasting your money.' And I said, 'Let me.'" It took 12 years, more than 30 experimental wells and millions of dollars before he came up with the technical solution.

That technical solution is known as "hydraulic fracturing" (or "fracking"), which involves injecting at high pressure a mixture of water, sand, and chemicals into the shale to fracture the rock and allow the release of the natural gas therein. In conjunction with fracking, horizontal drilling is used to maximize the surface area of the borehole through which the gas is collected (CSUG, n.d.).

Some environmentalists complain that the chemical compounds used in fracking threaten to pollute soil and groundwater, and they decry the volumes of water used in the production process (Campbell, 2010). In addition, some global warming alarmists oppose the development of new stores of fossil fuel. But in many instances, fracking is conducted thousands of feet below aquifers, and the strata are separated by millions of tons of impermeable rock (Energy in Depth, 2010). Moreover, ever larger quantities of the water used in fracking are recycled. The industry also maintains that stringent regulatory standards are in place to protect the environment (American Petroleum Institute, n.d.). And, as detailed in another article in this edition of *Fraser Forum* ("Birds, bats, and the trade-offs of wind power," pg. 10), all sources of energy—"renewables" included—involve environmental trade-offs.

Initially, fracking and horizontal drilling were too costly for widespread adoption. But as oil prices rose, these techniques became more cost-effective. Since then, economies of scale and technological innovations have "halved the production costs of shale gas, making it cheaper even than some conventional sources" (*The Economist*, 2010, Mar. 11).

Energy analysts expect further cost reductions in shale gas production as major oil and gas companies invest in new technologies. For example, production costs have fallen to $3 per million Btu at the Haynesville Formation, which encompasses much of the US Gulf Coast, down from $5 or more at the Barnett Shale in the 1990s (Jaffe, 2010, May 10).

The turnabout in shale gas fortunes is all the more remarkable given predictions in the past decade that Canada and the United States were running low on natural gas (Energy Information

Administration, 2003). US Federal Reserve Chairman Alan Greenspan, for example, declared in 2003 that the United States would have to import liquid natural gas to meet demand (Fine, 2010).

Doing so would have increased reliance on supplies from Russia and Iran, hardly an appealing prospect for anyone intent on "energy independence." Before the shale gas boom, both countries were thought to control more than half of the known conventional gas reserves in the world (Energy Information Administration, 2010b). Now, however, Canada and the United States have access to huge domestic stores.

This could cause dramatic shifts in global petro-politics. As energy analyst Amy Myers Jaffe notes, "Consuming nations throughout Europe and Asia will be able to turn to major US oil companies and their own shale rock for cheap natural gas, and tell the Chavezes and Putins of the world where to stick their supplies—back in the ground" (Jaffe, 2010, May 10).

The new accessibility to shale gas will also moderate the influence of OPEC and any potential natural gas cartel by providing affordable and reliable alternative sources of energy. Indeed, US production of natural gas in March hit an historical monthly high of 2.31 trillion cubic feet, topping Russia to become the largest producer in the world (Energy Information Administration, 2009). Consequently, natural gas exports once headed to North America are instead heading to Europe, thereby forcing Russia to lower prices for its once-captive customers (Fine, 2010).

Illustrating the new political tectonics is the recent agreement between Chevron and Poland for natural gas development and production. According to Dr. Daniel Fine of the Mining and Minerals Resources Institute at MIT, "When Chevron announces that they have gas [in Poland], then Russia is shut out" from having a monopoly in Eastern Europe (Fine, 2010).

Canada will also feel the effects of the energy market shifts. For example, the expansion of US supplies[6] means that Canada will need to find new export opportunities for its natural gas. However, this should not cause problems, analysts say, because supplies of conventional natural gas are declining elsewhere while fuel demands for transportation and electricity are growing (Welsch, 2010, Feb. 23).

The private sector is adept at adjusting to shifting trends. For example, a shipping terminal for natural gas imports to be built by Kitimat LNG Inc. was redesigned for exports to the Pacific Rim due to "increases in supply throughout North America—including in the US, Canada's traditional export market" (Kitimat LNG Inc., 2008).

Unfortunately, federal and provincial governments remain wedded to energy policies that lack the knowledge and wisdom of private investors and fail to account for the dynamic nature of the market. Vast infusions of subsidies obscure the true costs of various energy sources, while disparate regulations and mandates inhibit the unfettered competition that would otherwise determine the most efficient and beneficial fuels. Policy makers and politicians could dramatically improve energy policy by releasing their ham-fisted grip on the energy market.

Notes

1 A provincial auction of land for shale gas exploration recently netted British Columbia more than $404 million—nearly twice the amount officials expected—making it one of the largest single land auctions in Canadian history.

2 Shale gas is categorized as "unconventional" because stimulation techniques are required to release the gas for retrieval (CSUG, n.d.).

3 One cubic foot of shale gas is equivalent to 1028 British thermal units (Btu). A Btu represents the heat content of a fuel. A single Btu is the quantity of heat required to raise the temperature of one pound of liquid water by 1° Fahrenheit at the temperature that water has its greatest density (approximately 39° Fahrenheit).

4 Levels of CO_2 emissions are considered important by those who are convinced that human-made emissions of carbon dioxide cause global warming. Currently, however, there is no credible evidence to support that hypothesis.

5 The service infrastructure established for conventional gas reservoirs could be used for shale gas with minimal changes (Canadian Centre for Energy, n.d.).

6 Estimates of shale gas resources have increased total US natural gas reserves by almost 50% in the past decade (Energy Information Administration, 2010a).

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