America's Fossil Fuel Fever

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It was not very long ago that America seemed headed on a path of reduced dependence on fossil fuels—oil, coal and natural gas—and greater reliance on renewable forms of energy, such as wind and solar. "Our addiction to fossil fuels is one of the most serious threats to our national security in the twenty-first century," Barack Obama declared while campaigning for president in 2008. Not only does the consumption of these fuels contribute to global warming, he argued; it also finances anti-American tyrants and terrorists. Upon entering the White House, Obama announced a series of programs aimed at promoting the transition from fossil fuels to climate-friendly renewables, and his 2009 economic stimulus package provided billions of dollars for green energy projects.

But Obama's commitment to renewables has wavered in the face of relentless attacks from Republicans in Congress and the economic realities of energy production. While reaffirming the importance of green technology in his recent State of the Union address, he celebrated the growth in domestic oil and gas output and promised to open even more areas to offshore drilling. "Over the last three years," Obama crowed, "we've opened millions of new acres for oil and gas exploration, and tonight I'm directing my administration to open more than 75 percent of our potential offshore oil and gas resources." So much for viewing fossil fuels as a serious threat to national security.

In fact, Obama and his Republican opponents want us to believe that the accelerated exploitation of domestic fossil fuels will enhance American national security. This is so, they say, because it will diminish US reliance on oil from Africa, the Middle East and other conflict-prone areas. This argument reflects a myopic calculation of America's national security interests. Not only will increased reliance on domestic fossil fuels perpetuate our vulnerability to disorder in the Middle East (given the global nature of the oil market and resulting oil-price dynamics); it will also expose us to a host of other perils, ranging from drinking-water contamination to accelerated climate change.

None of this, however, appears to be influencing the development of policy in Washington. What explains this fresh embrace of fossil fuels at the centers of power? Some of it is political, of course, reflecting the relentless lobbying and advertising efforts of the giant energy corporations. But it also follows from critical developments on and beneath the ground, where new technologies have been brought to bear in a powerful drive to boost domestic fossil fuel output.

Until very recently, it was widely believed that US oil and natural gas production would follow a path of steady decline, as older fields were depleted and the rate of new reservoir discovery continued its downward trajectory. It was further assumed that production in the Western Hemisphere as a whole would decline, as major fields in Canada, Mexico and Venezuela were exhausted. All this, it was believed, would result in greater US reliance on oil and gas imports from the Middle East, Africa and the former Soviet Union.

These assumptions were reflected in the projections published every year by the Energy Information Administration, the research arm of the Energy Department. In 2005 the EIA predicted that total US liquids output (including crude oil, natural gas liquids, biofuels, shale oil and other unconventional fuels) would decline from 9.1 to 8.8 million barrels per day by 2025. Because net US liquids consumption was expected to climb from 20 to 28 million barrels per day over this period, imported

oil would have to jump by about 75 percent—making the United States highly dependent on the Middle East, Venezuela and other problematic sources.

But today, says the EIA, the outlook is very different. The agency now predicts that total US liquids production will climb to 12.1 million barrels by 2025—a 38 percent increase over the 2005 projection. If accurate, this increase, combined with an expected slowdown in the demand for oil (because of the current sluggish economy and longer-term improvements in automobile fuel efficiency), will produce a sharp drop in the amount of oil that will have to be imported in 2025—from the 2005 estimate of 19 million barrels per day to just 8 million in the 2012 projection. If it materializes, this import drop could prove highly beneficial for the US economy and foreign policy.

Several other countries in the Western Hemisphere, including Brazil and Canada, are also expected to post significant increases in oil output. Because of new offshore fields, Brazil is projected to double its output of crude over the next fifteen years; Canada, drawing on the Athabasca tar sands of Alberta province, is predicting a 50 percent increase. It is predictions like these that prompt energy analysts like Daniel Yergin, a prominent industry consultant, to see a renaissance in regional oil production. “Today, what appeared irreversible is being reversed,” he wrote in October. “The outline of a new world oil map is emerging, and it is centered not on the Middle East but on the Western Hemisphere.”

Although certainly impressive, this surge in Western Hemisphere energy production is not the product of giant new discoveries, as was the case in earlier oil booms, but of a high-tech assault on previously identified reservoirs that were long considered inaccessible—either they were too far underground, too far offshore or too encased in solid rock to be extracted profitably. But with oil prices hovering around $100 per barrel and the development of new extractive technologies, it is increasingly feasible to tap into these so-called unconventional sources of supply.

According to the EIA, an ever increasing share of the nation’s liquid fuel will come from unconventional sources, including deep offshore and Arctic oil, shale oil, tar sands, biofuels and liquids obtained from coal and natural gas. Although relatively abundant, these supplies can be extracted only through costly technologies—like the multimillion-dollar rigs used to drill for oil in the Gulf of Mexico—and by posing severe risk to the climate and the environment. Any increase in Arctic output, for example, will threaten the survival of endangered land and sea creatures, and increased offshore drilling poses a risk of further spills on the scale of the BP/Deepwater Horizon disaster of April 2010.

As in the United States, the projected increase in Brazilian and Canadian energy output will rely on unconventional sources of supply. For Canada, this means the accelerated development of Albertan tar sands. For Brazil, it involves developing oil reservoirs buried beneath miles of ocean, sand and salt—termed “pre-salt” reserves by the Brazilian government. All of these supplies must be extracted by costly, complex means that involve extreme environmental hazards.

For those who welcome the increase in oil and gas production, the development of these unconventional sources is a triumph of technology and deserves strong public and government support. By promoting these technological advances, Yergin claims, the United States will reap economic benefits, in terms of jobs and corporate profits, and improved “energy security”—meaning reduced exposure to the violence, corruption and authoritarianism that often accompany oil and gas production in other parts of the world.

These arguments are being appropriated by the Republicans in their efforts to undermine Obama and drive him from office. Along with a push for increased US oil and gas production, the Republicans favor greater reliance on Canadian tar sands and the construction of the Keystone XL

pipeline across the Midwest to refineries on the Gulf Coast. Although it is strongly opposed by environmentalists, pipeline proponents claim it will create jobs and promote energy security. “According to the Department of Energy, this one project will ‘essentially eliminate’ oil imports from the Middle East. It will create more than 100,000 jobs and strengthen our relationship with a close ally and trading partner,” declared Republican Fred Upton, chair of the House Energy and Commerce Committee. “A project like this should be a no-brainer.”

Claims like these will fill the airwaves, Congressional hearings and Republican rallies as this election year proceeds. Even some Democrats appear to be succumbing to the barrage, fearful of appearing to oppose the prospect of added jobs or abundant domestic energy at a time of economic duress. Lately, President Obama has been especially conspicuous in his support for increased reliance on fossil fuels: although he blocked the initial route of the Keystone XL pipeline on environmental grounds, he has voiced strong support for offshore drilling in the Gulf of Mexico and accelerated exploitation of shale gas reserves. It is essential, then, to subject these claims to exhaustive scrutiny. To begin, just how reliable are the projections of future increases in US and hemispheric oil and gas production? Second, can the increases be achieved without grievous harm to the environment and surrounding communities? Third, and most important, do the professed benefits of the oil and gas boom outweigh the potential dangers?

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No one can be certain about future oil and gas production levels, especially given the relative immaturity of many of the new technologies. But there are good reasons for doubt. Take shale gas, the most ballyhooed of all the new sources. According to the EIA, US shale gas production will soar from 2.9 trillion cubic feet in 2009 to 12.3 trillion in 2030. To achieve this increase, however, energy companies will have to sink tens, perhaps hundreds, of thousands of wells across the United States—many of them in relatively densely populated rural areas of Ohio, Pennsylvania and New York—and inject mammoth quantities of chemically laced water into the underground shale formations to shatter the rock and release the gas trapped within, in a process known as hydraulic fracturing, or “fracking.”

Many of these wells will find significant concentrations of gas—but many will not. Given the uneven distribution of embedded gas molecules, a new well drilled a mile or so from an existing prolific well could easily come up empty. In fact, the EIA recently downgraded its estimate of US shale gas reserves by more than 40 percent, from 827 trillion cubic feet to 482 trillion. Even more significant, the Marcellus Shale Formation of the Northeast, widely considered the most promising shale gas “play,” was downgraded from 410 trillion cubic feet in the 2011 estimate to 141 trillion in the 2012 report—an eye-catching drop of 66 percent. These revisions are said to represent greater experience in drilling, which, as noted, tends to produce many dry wells.

More important, perhaps, than the likelihood of disappointing production figures is the steady growth of the anti-fracking movement in many parts of the country. Not only does the well-drilling disrupt rural communities, producing round-the-clock noise and traffic from heavy tankers and trucks; the use of toxic chemicals to liberate the gas threatens the safety of water supplies in a variety of ways, from the leaking of the toxic fracking water into underground aquifers to the dumping of the returned water (called flowback) into municipal water-treatment systems, which are not equipped to handle them. As these irritants and dangers have multiplied, more and more people are demanding strict county and state regulation of—if not an outright ban on—fracking, and the Obama administration is considering tougher federal standards. The anti-fracking activism will probably not halt the expansion of shale gas production, but it will certainly reduce the number of wells, lowering total output.

The same can be said of all the other unconventional sources of energy fueling the hemispheric boom. The EIA projects the output of Canadian tar sands, for example, to jump from 1.7 million barrels per day in 2009 to 4.8 million in 2035, an impressive 180 percent increase. But these numbers gloss over the mounting production difficulties the industry is likely to encounter as near-surface bitumen deposits are exhausted and energy firms turn to more costly and complex techniques to exploit deposits buried deeper underground. These techniques require vast amounts of water and energy; as in fracking, moreover, the process produces huge volumes of contaminated water that must be kept from escaping into drinking supplies. Until now, Alberta's government has promoted tar sands production as a way of generating jobs and income. However, concern over the energy waste and environmental risk is growing, and it cannot be assured that a favorable regulatory atmosphere will persist. All of this calls into question the reliability of the EIA's long-term output projections.

Brazil's "pre-salt" oil presents a roughly similar picture. Again looking at the EIA's most recent projections, we find that Brazil's oil output is expected to rise by 2.8 million barrels per day between 2009 and 2035, with virtually all the increase coming from the pre-salt fields in the Atlantic, about 200 miles southeast of Rio de Janeiro. These fields are located beneath a mile and a half of ocean and another two miles of sand, rock and shifting salt layers. To reach them, Brazil's state-controlled oil company, Petrobras, will have to use drilling technology even more costly and sophisticated than that used by BP, ExxonMobil and other private firms in the Gulf of Mexico. But given the instability of the underground salt strata, the risk of a catastrophic blowout like the one that destroyed the Deepwater Horizon will be ever-present. Brazilian officials say they can overcome the risk, but every step will be fraught with danger.

It is apparent, then, that unconventional oil and gas production will rise in the United States, Canada and Brazil—but probably not to the levels prophesied by Yergin, the EIA and other enthusiasts. To the degree that it does rise, moreover, production will entail growing risk of environmental damage. Because an ever-increasing share of the region's oil and gas output will be derived from these unconventional sources, the likelihood of environmental catastrophe is bound to grow.

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Advocates of the new techniques claim that the environmental risks are overshadowed by the greater benefit of economic gain and national security. "Even while the environmental argument rages," Yergin wrote in the Washington Post in October, "oil sands are proving to be a major contributor to energy security" by lowering the nation's dependence on Middle East oil. Increased domestic production, he adds, is generating jobs and reducing the nation's dollar outlays for imported petroleum.

These arguments have great appeal and are attracting support. But they are deeply flawed. While highlighting some benefits to the nation's security and well-being, they overlook detrimental outcomes of equal or greater significance.

The most important, of course, is the impact of these trends on global warming. By shifting the emphasis from renewables to fossil fuels, we can expect a significant increase in greenhouse gas (GHG) emissions—from the consump-tion of oil and gas and from its production. The consumption aspect is well understood: all fossil fuels contain carbon and this carbon is released when the fuels are burned, so any increase in fossil fuel use will result in increased GHG emissions. But the production aspect requires closer attention. All drilling activity requires energy, which produces GHGs; producing unconventional oil and gas, however, usually requires far more energy than drilling for conventional fuels and so emits a correspondingly greater amount of GHGs.

Conventional oil and gas supplies are usually carried to the surface by natural forces once a well is drilled, whereas unconventional fuels are too dense to move by themselves (as in the case of tar sands) or are embedded in rock (as in the case of shale oil and gas) and so must be extracted using energy-intensive techniques. Hence, in addition to all the emissions we can expect from the prolongation of the fossil fuel era, we will experience a GHG increment from the growing reliance on unconventional hydrocarbons. Based on this sort of reasoning, the EIA calculates that global emissions of carbon dioxide will rise by 43 percent between 2008 and 2035, jumping from 30.2 billion to 43.2 billion metric tons. Such an increase will erase any hope of averting the apocalyptic consequences of planetary warming.

The fossil fuel adherents in the United States respond to this assessment by claiming that increased production of natural gas will reduce reliance on coal (which when burned releases twice as much carbon dioxide per unit of energy as gas) and so will help slow the increase in GHG emissions. Gas, we are told, is the "clean" fossil fuel when compared with "dirty" coal—and thus provides a "bridge" to the Renewables Era, which will arrive in some far-off future. A growing number of skeptics are questioning this claim on scientific grounds, saying that shale gas production often releases a significant quantity of methane—a far more potent GHG than carbon dioxide—thereby eliminating any benefit in climate terms. But this aside, the renewed US embrace of fossil fuels is impeding progress toward alternative fuels, thus undermining the "bridge" argument. While increased gas output could, theoretically, provide a bridge to a greener future, says Henry Jacoby, an economist at the Center for Energy and Environmental Policy Research at MIT, it must be accompanied by massive investment in green energy technology—something we do not see today. "You'd better be thinking about a landing of the bridge at the other end," he said. "If there's no landing at the other end, it's just a bridge to nowhere."

Finally, there is the overarching claim that increased reliance on domestic oil and gas plus Canadian tar sands will insulate us from the chaos and violence of the Middle East. This is the trump card that Yergin and others play when all others are lost. But this, too, is bogus. Oil is a global commodity, so even if we obtained most of our oil from Western Hemisphere sources, we would still feel the effects of conflict elsewhere through the inevitable spikes in energy prices. Don't expect Exxon and Chevron to give us a cheaper rate on the oil they produce here if they can sell it on international markets for twice as much—that's just not going to happen. So we will remain just as vulnerable to international oil crises after expanding our reliance on shale oil and tar sands.

In fact, we will become more vulnerable over the long run, because the renewed embrace of fossil fuels will induce us to postpone the inevitable transition to a postcarbon economy. Sooner or later, the economic, environmental and climate consequences of intensive fossil fuel use will force everyone on the planet to abandon reliance on these fuels in favor of climate-friendly renewables. This is not a matter of if but of when. The longer we wait, the more costly and traumatic the transition will be, and the greater the likelihood that our economy will fall behind those of other countries that undertake the transition sooner. By extending our dependence on fossil fuels, therefore, the current oil and gas revival is not an advantage but, as Obama said in 2008, a threat to national security.

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