The Geopolitics of Natural Gas

Natural Gas in the United States

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by

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About the Study

Some of the most dramatic energy developments of recent years have been in the realm of natural gas. Huge quantities of unconventional U.S. shale gas are now commercially viable, changing the strategic picture for the United States by making it self-sufficient in natural gas for the foreseeable future. This development alone has reverberated throughout the globe, causing shifts in patterns of trade and leading other countries in Europe and Asia to explore their own shale gas potential. Such developments are putting pressure on longstanding arrangements, such as oil-linked gas contracts and the separate nature of North American, European, and Asian gas markets, and may lead to strategic shifts, such as the weakening of Russia's dominance in the European gas market.

Against this backdrop, the Center for Energy Studies of Rice University's Baker Institute and the Belfer Center for Science and International Affairs of Harvard University's Kennedy School launched a two-year study on the geopolitical implications of natural gas. The project brought together experts from academia and industry to explore the potential for new quantities of conventional and unconventional natural gas reaching global markets in the years ahead. The effort drew on more than 15 country experts of producer and consumer countries who assessed the prospects for gas consumption and production in the country in question, based on anticipated political, economic, and policy trends. Building on these case studies, the project formulates different scenarios and uses the Rice World Gas Trade Model to assess the cumulative impact of country-specific changes on the global gas market and geopolitics more broadly.

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Introduction

The United States is at once a massive and marginal player in the world of natural gas. As of 2011, it was the world's largest consumer of natural gas, using over 24 trillion cubic feet (Tcf), 36 percent more than Russia, the second largest consumer.[1] The same year, it produced 23 Tcf of natural gas, barely 2 percent less than Russia, then the largest producer. No other country came close: the third largest consumer, China, used only 4.6 Tcf of gas, while the third largest producer, Canada, produced only 5.7 Tcf. The United States is also the world's fastest growing natural gas producer, bringing more than 4 Tcf of new production online in the five years ending in 2011, more than double the nearest competitor, Russia. Its consumption growth, at nearly 2.7 Tcf in the five years ending in 2011, has (tied with Russia and China) also led the world.

Long-term trends are likely to depend on reserves as much as on current production, but there is enormous uncertainty surrounding how the United States scores there. Even with recent shale gas discoveries, the United States still ranks well behind Russia, Iran, and Qatar, the world's three dominant reserve holders.[2] In recent years, however, US reserve growth has been exceptional, vaulting it rapidly from a declining player to the top echelons of the second tier.

Yet the United States is a bit player in world natural gas trade. The United States is an active participant in the integrated North American natural gas market, but it barely registers in the world of liquefied natural gas (LNG).[3] Its LNG imports of 10 billion cubic meters (bcm) in 2011 were less than a tenth of the volume bought by the biggest LNG importer (Japan) and ranked behind seven additional countries. Its LNG exports, at a mere 2 bcm, trailed 16 others, and totaled a mere 2 percent of the volumes shipped by the biggest seller, Qatar.

But the United States has become a focal point for a third reason: rapidly changing technology, and the consequences that might entail. Innovations in natural gas production from deep shale formations have turned the United States from a backwater to the newest frontier of natural gas

[1] All figures from the US Energy Information Administration, "International Energy Statistics," http://www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm?tid=3&pid=26&aid=24.
[2] BP, *BP Statistical Review of World Energy 2012*, http://www.bp.com/content/dam/bp/pdf/Statistical-Review-2012/statistical_review_of_world_energy_2012.pdf.
[3] Ibid.

production in a mere decade. Ten years ago, shale gas barely registered in the national conversation. The US Energy Information Administration (EIA) now projects that it will reach half of US output by 2035.[4] This wealth of natural gas has already upended assumptions about the likely role of the United States as a major LNG importer. It is now fueling speculation that the United States could shake up world markets by becoming a major LNG exporter too.

This case study shows that the new US production made possible by the technological revolution in shale is likely to allow the United States to avoid major natural gas imports for the foreseeable future. Yet it also shows that when a major producer is also a large consumer, greater reserves and production will not necessarily translate into substantially greater exports or impact on world markets; instead, those new resources will largely be absorbed at home. This case study also highlights the political dynamics surrounding gas production and trade in and from the United States—the most open, flexible, and private sector dominated market in the world—and shows that even the relatively modest role of government, political, and other non-economic considerations could become powerful in shaping the future of US natural gas.

Background

Natural gas supplies four major US markets: electric power (34 percent), industrial (30 percent), residential (21 percent), and commercial (14 percent).[5] Residential and commercial consumption, which are dominated by natural gas (76 percent share), have long been stagnant.[6] Industrial and electric power consumption, in contrast, have recently been on the rise. As of 2010, only 41 percent of the energy used by US industry came from natural gas, with another 40 percent coming from oil, leaving considerable room for natural gas to penetrate. Electric power saw natural gas provide only 19 percent of its fuel in 2010, far behind coal (48 percent) and less than nuclear (21 percent), again suggesting ample opportunity for future expansion.

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[4] US Energy Information Administration, *Annual Energy Outlook 2012,* June 25, 2012, http://www.eia.gov/forecasts/archive/aeo12/.
[5] Data from the US Energy Information Administration, 2011.
[6] US Energy Information Administration, *Annual Energy Review 2011*, http://205.254.135.7/totalenergy/data/annual/pdf/sec2.pdf.

The United States has an elaborate pipeline infrastructure for transporting natural gas.[7] Its network extends over more than 210 pipeline systems that total more than 300,000 miles. Regulators have long required that transportation capacity be unbundled from the gas commodity and from pipeline ownership, allowing open access to transmission capacity and facilitating a liquid market. More than two dozen hubs provide focal points for transparent price discovery, and relatively light financial regulation has allowed several (most notably the Henry Hub in Louisiana) to become physical foundations for robust financial markets in natural gas futures. The US network is also thoroughly integrated into the Canadian and Mexican ones, creating a unified North American market backed by the North American Free Trade Agreement (NAFTA) that allows natural gas to be easily moved between the three countries without physical or tariff barriers.

Many have persuasively argued that this robust market has played a substantial role in the growth of US shale gas production.[8] Open pipeline networks allowed entrepreneurial independent producers to sell any shale gas they could produce at the prevailing market price. Liquid futures markets allowed them to sell their output forward, providing a foundation for debt financing of their investments, allowing them to scale up production far more rapidly than the traditional approach of financing expansion through cash flow from prior investments.

US facilities for LNG trade are considerably less well developed than the other aspects of the US market. The United States has eight LNG import facilities with a total capacity of 12 billion cubic feet (bcf) per day, and one export facility (in Alaska) with a capacity of 0.22 bcf per day.[9] The import facilities are located in Massachussetts, Maryland, Georgia, Louisiana, and Texas. After one terminal (Everett, Massachussetts) came into service in 1971, 10 years passed before a second (Lake Charles, Louisiana) entered operations in 1981. The other six came into service between 2003 and 2008. During the same period, anticipating a need for large-scale imports (prior to the emergence of shale gas), a host of other applications to import LNG were filed.

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[7] US Energy Information Administration, "About US Natural Gas Pipelines," June 2007, http://205.254.135.7/pub/oil_gas/natural_gas/analysis_publications/ngpipeline/fullversion.pdf.
[8] Philip K. Verleger, Jr., "The Amazing Tale of US," *The International Economy* Spring 2012: 8-62, http://www.international-economy.com/TIE_Sp12_Verleger.pdf.
[9] Data from the US Energy Information Administration, Gas Transportation Information System Exports/Imports Database.

Another dozen import terminals received approvals but did not subsequently commence construction, while 18 more permit applications were withdrawn, suspended, or denied.[10] The emergence of shale gas and resulting low US natural prices have caused the existing import facilities to be generally idle. The exception is the small volume of continuing LNG imports required primarily by constraints in the US pipeline network that force parts of New England to rely on imported natural gas despite a US market that is generally well supplied.

These physical and market features have played out against shifting political coalitions. Natural gas policy has typically pitted consumers against producers, consumers against other consumers, and producers and pipeline-builders against environmental groups. Consumers and producers have often found a common cause—more gas is good for both of them—but until the 1980s, the two groups fought bitterly over price controls, with the former in favor and the latter opposed. With the demise of price controls, this dynamic is no longer an explicit part of the US debate, but aspects of it are reappearing in the context of fights over LNG exports. Different groups of consumers have consistently battled each other, since restraints on consumption in any one sector typically reduce prices and increase availability in others. Indeed, in 1978, natural gas was determined to be so valuable for use in buildings and industry that certain existing, as well as increased use of natural gas in power generation was disallowed, leading to a fall in demand; the restrictions were not reversed until 1987. Natural gas production has also been the subject of battles between environmental groups, who have historically focused on local risks (rather than climate change), and producers, who have consistently viewed environmental regulation as threatening their operations and profits.

Political Trends

The US political system is stable at its most fundamental level: its system of government and basic rules have survived largely unchanged since its founding in 1776 and the adoption of its constitution in 1787. Yet within that framework, there is constant change, with large potential consequences for the development of natural gas.

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[10] Energy.gov, Office of Fossil Energy, http://fossil.energy.gov/programs/oilgas/storage/publications/Complete_LNG_Terminal_Status_Maps_Q2_201.pdf.

The United States has peaceful mechanisms for the transfer of power, but power transitions are far from predictable: leadership changes are frequent and can have far-reaching consequences for the energy industry. The transition from the George W. Bush administration to the Barack Obama administration in 2009, for example, led to efforts to repeal tax advantages for oil and gas companies, attempts to pass ambitious climate legislation, a scaling back of ambitions for expanding offshore drilling, and, in general, a broadly different attitude toward energy.

Changes in power can also cause discontinuity at the state level, where many of the most important decisions governing natural gas development occur. In most states with large and established oil and gas sectors, such as Texas and Louisiana, policies tend to be stable and consistently pro-industry. There are, however, exceptions: Alaska policy, for example, has changed substantially from governor to governor, even when the changes were within the same political party. There is more uncertainty in states where the energy industry is not as established, prominent, or influential. In these states, leadership changes could be far more consequential. These include Pennsylvania, New York, and Colorado (for shale gas development), and California and Florida (for offshore gas).

US policy, including energy policy, is developed primarily through battles among diverse stakeholders, overlaid with partisan competition between Democrats and Republicans. Energy policy has historically been driven primarily by the former, with producers, consumers, and environmental groups playing primary roles, each trying to influence political outcomes through direct lobbying, public education, grassroots activities, and political campaign spending. At the federal level, this often manifests itself as interregional competition, as different regions have different concentrations of certain interest groups (e.g., natural gas producers in Texas and industrial consumers of gas in the Midwest).

In recent years, though, partisan politics has become an increasingly important factor in energy policy outcomes. Republicans have become increasingly reliable allies of business and advocates of a light regulatory hand, while Democrats have become increasingly hostile to large oil and gas companies and sympathetic to greater regulation, particularly on environmental grounds. This has accompanied an increasing use of energy policy as a way to signal broader political

preferences. Republicans, for example, have attacked government spending on clean energy (most notably, loan guarantees to certain solar manufacturers) in an effort to send a broader message about the appropriate role of government in the economy. Democrats, for their part, have sometimes pursued environmental policies (most notably, delaying the Keystone XL oil pipeline) as a way of showing that the power of big business is not unlimited. As energy policy is used to demonstrate broader political preferences, and against a backdrop of strong political polarization in Washington as of this writing, pragmatic compromise may become more difficult.

Consequences of Political Trends for Future Development

Both the US federal and many state governments are deeply involved in the energy sector through policies that promote the use and development of particular energy sources, and through regulations that affect access to resources as well as development costs. Natural gas development (particularly the development of shale gas) can also be influenced by local governments.

Access and Other Supply Side Policy

As of 2008, the US Bureau of Land Management estimated that federal lands contained 231 Tcf of undeveloped, technically recoverable natural gas resources, of which 137 Tcf were available for development.[11] Most of this, though, was subject to special restrictions, with only 24 Tcf available under standard lease terms. Federal lands were also estimated to house 69 Tcf of proved reserves. These figures have presumably risen with recent breakthroughs in shale gas extraction technology, but no new estimates are available. As of 2007, another 290 Tcf was estimated to exist under the Outer Continental Shelf, of which 77 Tcf (mostly in the eastern Gulf of Mexico and the Atlantic) was unavailable to leasing. In contrast, total US proved reserves add up to roughly 300 Tcf of natural gas, and total US technically recoverable resources of natural gas are estimated to total approximately 2,500 Tcf.[12] It is thus reasonable to conclude that restrictions on access to federal lands are of limited importance to US natural gas production potential. That said, federal policy can have consequences for access to public lands, including

[11] US Departments of the Interior, Agriculture, and Energy, *Inventory of Onshore Federal Oil and Natural Gas Resources and Restrictions to Their Development*, 2008, http://www.blm.gov/pgdata/etc/medialib/blm/wo/MINERALS__REALTY__AND_RESOURCE_PROTECTION_/energy/EPCA_Text_PDF.Par.18155.File.dat/Executive%20Summary%20text.pdf.

[12] "Resources," NaturalGas.org, http://www.naturalgas.org/overview/resources.asp.

on the Atlantic and Pacific coasts, in the Gulf of Mexico, in Alaska, and in the Rocky Mountains. A recent trend toward opening up more offshore area in particular appears to have reversed itself in the wake of the Macondo oil spill in 2010, though future political change (and more time elapsed since the accident) could well change that. Indeed, despite the current focus on shale gas development, the potential for increased production from offshore areas could be of comparable importance. It is also particularly relevant in Alaska, which might have special impacts on the United States' role as a natural gas exporter.

State and local rules governing development on private and state lands may be more consequential. They could, in theory, apply to all potential development. In practice, few gas-rich states are likely to feel sufficient political pressure to put most lands off limits. The most likely exceptions are states like Pennsylvania, Ohio, and New York, all of which have substantial shale gas resources but feature significant opposition to their development, with New York being the most uncertain as of this writing. Developments as of July 2012 suggested that there would be no absolute restrictions to private shale gas development in Pennsylvania and Ohio, save some local bans in areas without substantial resources. This might change, particularly in Ohio (where the industry is not yet entrenched), if there were a series of large, visible accidents. (That said, shale gas production has created significant economic gains in parts of Ohio and Pennsylvania, which would make strong restrictions politically difficult in many cases.)

New York state, in contrast, had an ongoing moratorium as of July 2012, and had offered a plan to open limited (but gas-rich) parts of the state to development, subject to majority local approval. It would thus be reasonable to expect that some fraction of New York State land potentially accessible to development will be kept away from extraction by local opposition. A future governor, though, might choose to shift course, either forcing all communities to admit development, or largely banning shale gas development in New York State.

Access restrictions are not the only way that policymakers influence development through the supply side. Taxation and royalty schemes, which are imposed by the federal government and by states, can also have significant consequences for the economics of resource development. Most states are careful to calibrate tax policy so as not to deter production, though they do not always

succeed; federal policy, on the other hand, can sometimes be less sensitive to such concerns. Various analysts have estimated that environmental regulations and new severance taxes could add as much as fifty cents to the production costs of a thousand cubic feet of natural gas from shale, but they are typically hard pressed to identify potential impacts beyond that.

International Commitments

Influences on US natural gas development extend beyond US policy. Canada and Mexico, in particular, play important roles. Under NAFTA, it is difficult for the United States to restrict the movement of natural gas across its northern or southern borders, a feature of the North American market that is unlikely to change. That said, with the US market much larger than the Canadian and Mexican ones combined, US-originated dynamics are likely to remain most important.

Obligations beyond North America could also play an important role in shaping US policy. The United States is obligated under several free trade agreements (most notably its agreement with Korea, KORUS, and several agreements with Central American countries) to allow LNG exports to those countries, and the US government is highly unlikely to abandon those commitments. That sphere of agreements could expand in the future, most notably to Japan through targeted provisions in a future Trans-Pacific Partnership (TPP) arrangement. The United States has also historically seen itself as a guardian and promoter of open international energy markets, which could influence its approach to trade questions concerning its own natural gas supplies. While the United States has no specific, quantitative international commitments to reduce its greenhouse gas emissions, the US government, both Republicans and (to a much greater extent) Democrats, has shown a strong desire to be able to tell a positive story about US carbon dioxide output. Greater availability of natural gas allows them to do that by driving down coal consumption, and in the process, greenhouse gas emissions. This will likely weigh against US decisions to restrict shale gas development.

Demand Side Policy

Indeed, more fundamental concerns about climate change will likely influence US policies, particularly (but not solely) among Democratic lawmakers. This is true at the state level as well. At the federal level, EPA regulations promulgated in early 2012 to make the use of coal in new

power plants difficult, expensive, and thus unlikely, placing natural gas in a strong position. Future regulations might favor gas in existing plants as well. This could happen in any one of several ways.

Coal-fired power plants face the prospect of increasingly stringent federal regulations on conventional pollutants, including sulfur dioxides (SOx), nitrogen oxides (NOx), and mercury. Coal-fired generators also face the possibility of increasingly strict regulations on ash disposal. All of these will discourage the construction of new coal-fired power plants and encourage the early retirement of inefficient existing ones. Natural gas is typically the beneficiary of this trend. Industrial boilers that currently use coal face similar challenges—and, again, natural gas tends to benefit, though in some cases industrial activity can simply cease to be economic (a reduced prospect compared to five years ago given relatively low natural gas prices).

Future policies to promote renewable power generation might blunt the impact of coal-related regulations on natural gas-fired power production. Federal policy encourages renewable generation by subsidizing both investment and production, and, in some cases, by guaranteeing loans for renewable energy facilities. All of these policies are, however, vulnerable to changes in political preferences: the tax credits that subsidize investment and production, for example, have lapsed many times. State-level mandates for renewable energy generation also encourage the replacement of coal with renewables, to the exclusion of natural gas. There have been longstanding discussions at the federal level regarding the possible creation of a federal renewable energy standard (RES), but as of yet, none have led to new laws. Moreover, those plans that have had some political success have generally been weak, often imposing no new burdens beyond existing state mandates; it is better to think of them, then, as backstops against policy changes at the state level than as new requirements in themselves.

An alternative policy known as a Clean Energy Standard (CES) began receiving some attention in 2011, though it has essentially no prospect of near-term adoption. A CES would be like an RES except that it would allow targets to be met by nuclear power or by fossil fuels with carbon capture and storage (CCS); in many renderings, it would allow partial credit for efficient natural

gas generation too. Depending on the design of a CES, it could boost natural gas demand for several decades, and possibly longer if CCS for gas were commercialized at a reasonable cost.

Nearly half of US natural gas consumption is used to heat homes and buildings. Improvements in building efficiency, which have long been discussed, could thus lower the demand for natural gas. There are, however, significant barriers to federal policy that would promote more efficient use of energy in buildings. State and local authorities, not the federal government, have jurisdiction over things like building codes and zoning that have the greatest impacts on building construction and operation. Nonetheless, the federal government can intervene by offering incentives to builders and owners, and state and local action are possible too.

Perhaps the greatest potential impact on natural gas demand would come from comprehensive climate change legislation. Cap-and-trade legislation, moribund as of 2011, is unlikely to return in the near future, but if one looks over the next two decades, it is certainly possible. So is some sort of carbon tax, whether developed alone, or more likely, as part of a package aimed at dealing with US fiscal challenges. Both types of policies would penalize coal relative to gas, though they would also hurt gas relative to lower emissions sources. The ultimate impact would depend on the stringency of the policy, though in most simulations, gas would benefit for some time (on the order of a decade or two) before having to be phased out in favor of zero carbon sources. As in the case of a CES, though, commercial availability of CCS for gas would alter that outcome.

The biggest wild card for future US natural gas demand may lie in the transport sector. Despite frequent discussions of the option of using more natural gas in cars and trucks, there has been little policy movement in this direction. Shifting ten percent of the current energy use in the transportation sector from oil to natural gas would boost gas demand by about 15 percent relative to 2012 levels.[13] In the past, there has been bipartisan interest in legislation that would boost the use of natural gas in vehicles (most notably, the NATGAS Act), but in 2012, that legislation collapsed amidst intense partisan positioning. It would not be unreasonable to expect that, within the next five years, some similar legislation might become feasible.

[13] Calculated based on numbers in "US Primary Energy Flow by Source and Sector, 2009," US Energy Information Administration, 2009, http://205.254.135.24/totalenergy/data/annual/pecss_diagram.cfm.

Export Policy

US law requires Department of Energy (DOE) review and approval for any natural gas exports to countries with which the United States does not have a free trade agreement (FTA).[14] Exports to countries with which the United States has applicable free trade agreements (a category that includes Canada and Mexico) are required to be approved expeditiously. For countries not covered by applicable free trade agreements, the review must lead to approval unless the project is determined to "not be consistent with the public interest." How this will be interpreted in practice remains unclear. The US government has, as of this writing, processed and approved two applications to export liquefied natural gas (LNG) to non-FTA countries, and others are pending, with the Department of Energy signaling that it will issue additional approvals. Reviews have considered the cumulative impact of large-scale exports on domestic prices, industry, and long-term reserves. In completing those reviews, the US government will also need to consider whether blocking LNG exports will simply displace imports from Canada or promote exports to Canadian demand centers (including potential LNG terminals).

Government also influences exports indirectly through approval for pipelines and LNG facilities, approval of the facilities being a federal issue under two different parts of the Natural Gas Act, and local permitting being largely a matter for the states. (Approvals for LNG facilities are distinct from approvals of permits to export LNG.) Substantial pipeline capacity currently exists, but if it were to become strained, political opposition to expansion is possible, similar to what was seen in 2011 with the Keystone XL oil pipeline. That said, environmental groups are unlikely to be as passionate about natural gas pipelines as they have been with oil ones, although some significant environmental opposition to both exports and pipelines has emerged in parts of the environmental community as a way to curtail hydraulic fracturing; some gas consumers also might oppose pipeline construction as a way to keep gas locked within the United States.

Decision-making Structures

US and state policy on natural resources is determined by legislatures and regulators, all of whom are influenced by public opinion, producers, consumers, and environmental groups.

[14] John Burnes, "DOE Issues Conditional Export Authorization of Domestic Natural Gas," Van Ness Feldman, PC, May 23, 2011, http://www.vnf.com/news-alerts-594.html.

Ultimately, though, infrastructure development decisions are made mainly by private investors and firms. Producers can often be sensitive to public opinion and domestic politics, attempting to maximize spin-off benefits to people near resource developments and providing campaign contribution to powerful politicians (as well as advertising during political campaigns). Meanwhile, private ownership of mineral rights in the United States helps shape the political environment further: landowners where the producers want to drill have a direct economic interest in successful development.

The political balance between producers, consumers, and environmental groups has varied over time, and will be important in determining future government policy. The oil and gas industry writ large is seen as being politically powerful, particularly at the federal level and in traditional energy-producing states such as Texas and Alaska. The natural gas industry, though, should be seen as partly distinct, particularly regarding shale gas development. The large oil and gas industry lobbies have typically focused most on oil; many of the most prominent shale gas developers have not been among their typical leaders. As a result, several independent gas producers recently formed a group known as America's Natural Gas Association (ANGA), with the goal of encouraging friendly policy toward natural gas. Achieving a coherent message given the fragmented industry structure and disparity of views in the industry, though, has reportedly been challenging.[15] Observers of US energy policymaking largely believe that ANGA and the various other industry trade associations (for example, the Natural Gas Supply Association and the Independent Petroleum Association of America) have made slow progress in developing into a political force capable of realizing their goals.

Gas consumers, in contrast, are far better organized. Electric utilities and chemicals manufacturers in particular are long established as powerful lobbying forces. Their interests partly coincide with gas producers, in that they all favor increased production, but they also clash, in that consumers will oppose many policies that might encourage greater gas demand (and thus higher prices). In particular, gas consumers in any one sector will presumably oppose policies that encourage greater demand in others, since it will raise their prices without any potential for offsetting support from the government.

[15] Interviews conducted by author.

Environmental groups also have mixed attitudes toward natural gas. Some have embraced the fuel as a lower-carbon alternative to coal, and hence a useful tool in combating global warming, though others are opposed to anything other than renewable fuels.[16] Pulling in the other direction, many environmental groups are deeply troubled by the possible local impacts of gas development, particularly on water supplies and air quality. (Indeed some groups have weighed in simultaneously on both sides.) Environmental groups, whose influence is currently greater at the state and local than at the federal level, are likely to remain ambivalent in gas policy debates.

One last group that might have some future influence on US gas policy is the national security community. While not necessarily influential with the mass public, national security thinkers can be highly influential with elites. Within the US national security world, abundant domestic gas is seen as important insofar as it forestalls US dependence on foreign sources. Some also see domestic gas as a potential substitute for oil that could help lower US oil dependence. The national security community is likely to emerge as particularly influential if demand side policies threaten to cumulatively shift the United States back into the position of a large LNG importer. In that case, opposition from national security quarters to new policies could prove to be powerful. Conversely, in the debate around exports, some national security experts argue that placing restrictions on exports could hurt the United States' trade relationships and geopolitical influence.[17]

Economic and Legal Factors

There is considerable uncertainty about near-term US economic growth prospects. As of August 2011, the Congressional Budget Office (CBO) estimated the US output gap (the shortfall of GDP relative to its full potential) at nearly ten percent (though some analysts argue that the real figure is lower).[18] Experts disagree widely regarding likely growth rates over the next few years. There is more consensus regarding longer-term growth rates. Most estimates are between 2 and 3 percent. As of late 2011, the CBO, for example, projected a long term growth rate of 2.4 percent.

[16] Within this group, some have recently become disillusioned by reports that methane leakage from natural gas operations greatly increases gas's climate change impacts. Those reports, though, appear to be deeply flawed.
[17] Michael Levi, *A Strategy for Natural Gas Exports*, Hamilton Project Discussion Paper, Brookings Institution, June 2013.
[18] "The Budget and Economic Outlook: An Update," Congressional Budget Office, August 2011.

The Philadelphia Federal Reserve survey of forecasters placed the median estimate of the average growth rate over the decade 2011-2021 at 2.8 percent, though that may be biased slightly upward by including an anticipated period of relatively high growth recovery from the current economic slowdown.[19] Weaker economic growth tends to reduce US appetite for environmental regulation, which should apply in the natural gas area, but also lowers enthusiasm for government incentives, which could lead to lower demand in areas like transportation, and to a lesser extent, electric power generation.

US developers depend on private capital to finance exploration and production. Additionally, they frequently stabilize their cash flow in the face of price fluctuations, using financial tools such as hedges. New regulation in the financial arena could thus have knock-on consequences for natural gas development. In particular, many shale gas developers require stable counterparties with long time horizons in order to sell their production forward, which in turn is necessary in order for them to secure inexepensive debt financing. Future restrictions on commodities trading by large banks, whose stability derives in part from implicit government guarantees, might lessen the availability of hedging services and hence drive up the cost of capital for some shale gas developers.[20]

Beyond these factors, and those discussed in the previous section, there is little else that is likely to have a major impact on the course of US natural gas development. Price controls, last seen in the 1980s, are unlikely to return to the US natural gas market; they are simply not part of the political conversation. Rent distribution is typically determined through the sorts of battles among interest groups that were discussed in the previous section. Land rights are generally clear, with occasional exceptions in the case of severed mineral rights, but those are unlikely to have large-scale impacts on the accessibility of US resources.

[19] "10-Year Real GDP Growth Rate (RGDP10)," Historical Data Files for the Survey of Professional Forecasters, Federal Reserve Bank of Philadelphia, www.philadelphiafed.org.
[20] IHS CERA, 2012.

Scenario Analysis

It appears easier to foresee supply side trends in the US natural gas market than to predict demand or trade developments. Major new access restrictions appear unlikely aside from the potential in New York State, perhaps accompanied to a degree in Ohio and Pennsylvania. Increased access to natural gas on public lands, particularly offshore, is possible; the course of future development will likely be a consequence of partisan politics (i.e., which party holds the US presidency), which is impossible to predict. Some new environmental regulations and severance taxes are also likely, though they are unlikely to impose large cost burdens on developers.

Predicting developments on the demand side is more difficult. Under future Democratic presidents, the EPA is likely to strengthen rules for particulate emissions, acid gases, and coal ash, boosting natural gas in competition with coal. Such moves are unlikely, at least in this decade, with a Republican president. (Beyond 2020, it is difficult to determine how partisan politics will align with energy and environment policy.) Some sort of carbon policy or clean energy strategy is likely to emerge by the end of the decade, though its stringency is essentially impossible to predict. Perhaps the most likely demand-side policy development related to natural gas is the introduction of legislation to create incentives for the use of natural gas in cars and trucks. Though immediate prospects for this appear dim, longer term possibilities look brighter.

The United States is likely to retain export restrictions in principle (i.e., to require approval for exports to non-FTA countries), though unlikely to sustain binding restrictions in practice (i.e., it will likely approve as much export capacity as the market demands). This could change, though, if the country experiences significant natural gas price volatility and LNG exports are blamed.

The US shift from a would-be natural gas importer to a neutral player or a significant exporter has already had consequences for the country's foreign and alliance policy. The United States, as an importer, might have felt compelled to shape its relations with Russia, Qatar, and others accordingly; today, it evidently does not. Unless the United States returns to the role of a significant importer, that dynamic is unlikely to be important.

The emergence of the United States as a significant exporter is, however, unlikely to alter its international relationships much. The one possible exception might come if the United States substantially restricted LNG exports. That could raise the ire of allies who are also importers, most notably Japan, thus damaging broader US trade and political relationships.

Growing domestic gas production may also help US foreign policy by reducing greenhouse gas emissions, something that other countries have demanded. This will not, however, remedy fundamental frustrations over the lack of a broad-based US carbon policy, or over the US approach (however justified) to global climate change negotiations.

Conclusion

The case study presented here affirms a major shift in the global gas market: the United States has reemerged as a major, and growing, supplier, and its likelihood of becoming a major importer has been deeply diminished. Domestic politics will affect its new trajectory as a supplier at the margin, and new policies might boost domestic demand, but they are highly unlikely to change the basic fact that the US position in world gas markets has changed, at least any time soon. The dispersed nature of natural gas decision-making and the market-based nature of the industry mean that supply side policy decisions will have difficulty affecting major changes in the course of natural gas development. National security concerns, meanwhile, will likely serve as a brake on ambitious demand side policies that might threaten to quickly return the United States to LNG importer status. This case study also reinforces the fact that big geopolitical changes can result from dynamics having little to do with geopolitics. The United States has avoided becoming a major LNG importer most immediately because of technology and domestic markets, not because policymakers decided that the country desperately needed more natural gas. The geopolitical consequences, though, have followed nonetheless.