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U.S. Natural Gas Policy: Recommendations for the President

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Overview

The view of natural gas has changed dramatically in only 10 years. Most predictions were for a dramatic increase in liquefied natural gas (LNG) imports to North America, which in turn triggered large capital investments in vertically integrated structures to move LNG to the United States from distant locations in the Middle East, Australia, West Africa, and Russia. However, small independent producers in the United States began to apply new techniques to extract natural gas from shale. The success of that entrepreneurial endeavor has resulted in sustained productivity improvements, attracted capital from major oil and gas companies and international investors, and triggered a paradigm shift that now has U.S. producers considering exports of LNG. In light of this, we have the following recommendations, which we expand on below:

- **Recommendation 1:** Introduce a nominal tax that will explicitly fund regulatory oversight of domestic energy development in an adequate manner.
- **Recommendation 2:** Increase federal involvement in ensuring the safety and adequacy of our nation's natural gas transportation infrastructure. This focuses not on interstate transportation, but more specifically on local distribution systems and how they are operated and maintained.
- **Recommendation 3:** End subsidization of technologies in end-use. Instead, redirect efforts into basic research and development (R&D) efforts so that breakthroughs can ultimately facilitate commercially successful energy technology deployment.
- **Recommendation 4:** Do not interfere with market-oriented allocation of capital-to-natural-gas related projects.

Background

The past decade has seen rapid development of technology allowing the recovery of natural gas from shale formations. Beginning with the Barnett shale in northeast Texas, the application of innovative new techniques involving the use of horizontal drilling with hydraulic fracturing has resulted in the rapid growth in production of natural gas from shale. Moreover, the techniques that have proven so successful in the Barnett shale have been successfully applied to other shale formations, including the Marcellus shale, Haynesville shale, Fayetteville shale, Eagle Ford shale, and elsewhere. In fact, success has

been so dramatic that the Barnett grew to become the largest single production play in the United States by 2008, then was surpassed by the Haynesville in 2011, while growth in the Marcellus threatens overtake both within the next two years. In sum, shale gas production in the United States has increased from virtually nothing in 2000 to more than 10 billion cubic feet per day (bcfd) in 2010.

Rising shale gas supplies have significantly reduced current and projected requirements in the United States for imported LNG. Moreover, if not disadvantaged by government policy, natural gas will likely play a very important role in the U.S. energy mix for many years. Of course, the fact that shale gas resources are generally located in close proximity to end-use markets is both a blessing and a curse. On the one hand, the fact that shale gas resources are located near large end-use markets means that development can benefit industry, and facilitate the generation of electricity and the heating of commercial and residential establishments at a relatively low cost. In short, it offers both economic and security of supply benefits. On the other hand, being close to end-use markets raises the specter of public opposition, which can be detrimental to development opportunities. However, in most regions opposition has not severely hindered development as U.S. shale gas production is now well over a quarter of domestic production, up from less than 2 percent less than 10 years ago.

As argued in the study "Shale Gas and U.S. National Security" by Kenneth Medlock, Amy Myers Jaffe, and Peter Hartley in 2011, rising production from shale resources has implications for both domestic and international market structure as well as geopolitics. In Europe, shale gas developments in the North American gas market have, by displacement, increased the availability of LNG, which has played a key role in the ongoing renegotiation of long-term oil indexed contracts. Russia has had to allow a portion of its sales in Europe to be indexed to spot natural gas markets, or regional market hubs, rather than oil prices. This change in pricing is a major paradigm shift.

In Asia, shale gas developments have, again by displacement, released supplies to be shipped to Japanese buyers in the wake of the 2011 nuclear disaster at Fukushima. Absent North American shale developments, LNG spot prices would likely be even higher as global competition for supplies would be more intense. In addition, upstream developers are now investigating opportunities to develop shale resources in Europe and Asia, which could have even more significant and direct long-term impacts on regional gas markets.

In sum, while many analysts have characterized shale in North America as game changing, it could be even more transformative in Europe and Asia. Shale developments in the United States are potentially market-structure altering. The existence of viable shale gas resources is evident in other regions around the world, and shale gas potential is being actively discussed and explored in Europe, China, India, Australia, Argentina, Brazil, South Africa, and elsewhere. The sheer size of the global shale gas potential could alter geopolitical relationships and exert a powerful influence on U.S. energy and foreign policy.

Despite the apparently positive outlook, it is important to point out that sustained, rapid development of shale gas in both the U.S. and abroad is not a certainty. A stable regulatory environment is critical to achieving the potential benefits outlined above. Of prime concern are environmental issues regarding the use and potential contamination of potable water. These sorts of issues must be addressed before the full benefit of shale can be realized.

Market structure is also very important when considering the growth opportunities for shale, and it is likely the most underappreciated factor that positively benefited growth in shale gas production in the United States. The small, independent producers are the upstream participants who drove the entrepreneurial efforts that led to the large increases shale gas production—not the large, integrated majors. Arguably, the entire conversation about shale gas would not be occurring had independent producers not taken the first steps into this new frontier, and they could not have done so absent the market structure that exists in the United States. For example, in the U.S. natural gas market, ownership of transportation capacity rights is unbundled from pipeline ownership. Unbundling of capacity rights from facility ownership makes it possible for any producer to access markets through a competitive bid. Many of the small producers that first ventured into shale might not have been otherwise willing to do so, specifically because access to markets could have been limited. By contrast, in most other markets globally, pipeline capacity is not unbundled from facility ownership—meaning large incumbent monopolies can effectively present barriers to entry through control of the transportation infrastructure.

More generally, the United States has a well-developed, competitive regulatory framework governing natural gas infrastructure development, transportation services, marketing, and mineral rights. This has promoted the rapid development of shale resources; it may not be fully or quickly replicable where government involvement in resource development and transportation is more prevalent. This could prevent market entry by large numbers of smaller producers who would be otherwise willing to test and prove concepts on a small scale. It is for this reason that U.S. energy security has benefitted from having an active sector of small, independent energy companies. Without this sector, U.S. shale gas production would likely have taken many more years to grow to its current levels. Of course this would have meant the LNG regasification terminals that were constructed in the last several years would be more greatly utilized, but it would also have yielded more market and geopolitical power to a few foreign natural gas suppliers.

Recommendation 1: Introduce a nominal tax that will explicitly fund regulatory oversight of domestic energy development in an adequate manner.

The State of Pennsylvania is a good example of how this can be of benefit. The recent rapid increase in drilling activity there exposed the fact that the state regulator did not have the staffing or capability to appropriately manage the permitting and inspection required in the wake of the growth in interest in the Marcellus shale resource. This, not surprisingly,

led to a great deal of public concern. The state responded by levying a tax that was used to fund agency growth. Going forward, the state now seems better prepared to manage the development of its resource wealth. At the federal level, the Environmental Protection Agency and its regional offices are being increasingly taxed to keep up with the rapid pace of development. Thus, a relatively small tax levied specifically to fund agency growth could go a long way toward alleviating public concern about a lack of proper oversight and ensuring safety.

Moreover, environmental oversight can be funded top-down to state agencies through this tax mechanism through transfer payments. This would leave regulation in the hands of the states but give the federal government a funding mechanism to ensure proper levels of oversight are maintained.

Recommendation 2: Increase federal involvement in ensuring the safety and adequacy of our nation's natural gas transportation infrastructure. This focuses not on interstate transportation, but more specifically on local distribution systems and how they are operated and maintained.

There are also issues with regional pipeline infrastructure, which must be adequately maintained. Much of this is outside of federal jurisdiction and is in the hands of state regulators; an example is the infamous San Bruno pipeline explosion in Northern California. But much of the methane escape, which is a potential immediate safety concern if it accumulates, that occurs in the transportation infrastructure occurs in older, not-as-well-maintained parts of the system, namely the local distribution network. At the core of the matter is the fact that incentives for the development and maintenance of long-haul interstate pipelines are very different from the development and maintenance of local distribution and intrastate infrastructure. The Federal Energy Regulatory Commission (FERC) and Department of Transportation, which oversee interstate infrastructure-related issues, have little to no jurisdiction in matters related to intrastate and local distribution infrastructure. Thus, we propose an oversight review function for FERC. This need not result in any binding ruling of commitment, but it would expose local issues and elevate transparency. This serves to promote safety, and it addresses an important point of concern raised by many environmental groups related to methane emissions resulting from growth in natural gas production domestically. The simple act of increasing transparency could pressure state public utility commissions to act more aggressively in ensuring our nation's gas delivery infrastructure is up to proper specification. This is critical if we are to achieve full realization of the potential economic benefit our nation's resource.

Recommendation 3: End subsidization of technologies in end-use. Instead, redirect efforts into basic R&D efforts so that breakthroughs can ultimately facilitate commercially successful energy technology deployment.

Too often policy focuses on deployment of technologies that are not commercial on their own. While there may be real benefits associated with doing this, the costs are ignored

in order to argue the appearance of an a priori net gain. This is critically evident in renewable generation technologies such as wind and solar. While each will ultimately have to be relied upon, they are only now commercially viable with subsidy or in niche applications. Moreover, the subsidies come at the expense of the taxpayer and consumer, while market participants must deal with the inadequacies of the technology, such as intermittency, which ultimately result in inefficient capital redundancy in the power generation grid, i.e., "backup" generation.

The recommendation here is to focus on basic R&D such as commercial scale electricity storage. This would not only solve the intermittency issue associated with renewables, it would also benefit the allocation of capital into power generation by removing the need for as much peaking forms of generation. This capital could then be allocated into other growth endeavors.

A simple analog is useful here. The current shale gas revolution in the United States has its roots in a Carter administration project known as the Eastern Gas Shales Project (EGSP). Geologists have long known about shale resources; the issue was always with technical and commercial recoverability. It is arguable that without the basic lessons of the 1980s and 90s in the upstream that are tied to the EGSP and carried forth by groups like GRI, the shale gas revolution might not have ever occurred. The key point here is that sometimes the gains from basic research do not reveal themselves until well into the future, in this case a 20+ year lead. But without the initial foray, the benefits may never be reaped.

One final point is that such a strategy is less costly right now given the abundance of natural gas. It provides a low cost bridge to a point when real breakthroughs are made and the commercial success of new technologies can be realized without government support.

Recommendation 4: Do not interfere with market-oriented allocation of capital to natural gas-related projects.

A major issue currently being discussed is whether or not LNG exports should be allowed from the United States. Of chief concern is the price impact of allowing exports, and what the concomitant impact would be on the domestic industrial base. In effect, the entire debate is about how to distribute the rent associated with an abundance of low-cost natural gas. The United States does not have a national energy company, nor should it. In fact, we have demonstrated that national energy companies are generally less efficient than publicly traded firms, with few exceptions. As such, how resources are used has not ever really been a sustained emphasis of policy. In fact, in times it has been a focus (for example, oil import policy in the 1970s), the policy ultimately failed because it places an arbitrary constraint on the market outcome. The bottom line is that gains from trade are real. And, if they are present, any constraint on their realization is net welfare reducing. Some groups will lose, but the net gains should be the focus of government rather than the performance of any single entity in the U.S. economy. Thus, we propose that industry

should be given the right to allocate its capital in the best manner it sees appropriate. Certainly, this will lead to some ex post unprofitable investment. In fact, we have argued that not much LNG will ultimately be exported from the United States longer term, but the market, in this way, is self-correcting.

By extension, this also suggests that the government should avoid policies that promote any particular technology. Such policies amount to picking winners. Government support distorts incentives and potentially inhibits longer term gains. This includes the promotion of CNG vehicles. Currently, adding CNG and LNG vehicles into fleets is a commercially viable option, and in fact fleet owners are doing this. This comes about because the fuel savings more than compensates for the differential fixed cost in high use vehicles. The standard private passenger vehicle requires subsidization to be cost effective, largely due to their lower mileage compared with fleet vehicles. A subsidy become increasingly problematic if it promotes large-scale adoption because it begins to erode the tax base associated with gasoline sales, which funds our roads and bridges, and it becomes increasingly expensive due to greater penetration. Thus, it is not a sustainable policy.

Conclusion

The bottom line is to allow market mechanisms determine the allocation of capital and penetration of new technologies. Longer term goals can be sustainably achieved if basic R&D is undertaken and funded through modest taxes on energy development and use. Moreover, the development of domestic resources can be done safely and effectively with proper oversight, but agency funding must be tied directly to development activity through taxation. This would go a long way toward allaying public concerns about future development of shale gas and light tight oil because the government would be well situated to properly and transparently regulate the industry.

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