The U.S Market for Liquid Natural Gas: Better Out than In
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I. Introduction

Over the past couple of decades, the natural gas economy in the United States has experienced immense change. Historically, our domestic supply equaled our demand, making the U.S relatively self-sufficient. This period ended in 1986, when imports of natural gas began to rise as consumption began to outgrow production, increasing costs. However, a more favorable equilibrium was restored in 2006 with the spike in growth of the U.S market, due to improved shale gas technology. Eventually, U.S production once again matched consumption in 2012, showing the favorable prospect of the U.S as a major player in the global market. After the recent success with natural gas, the United States needs to look into options that can improve the scale and success of its operations, especially regarding liquid natural gas. In this paper, I will discuss the basics of liquid natural gas (LNG), why the U.S should expand its production, and how to go about this process.

II. What is Liquid Natural Gas?

Liquid natural gas is natural gas that has been cooled to -260°F, the point at which it condenses into a liquid. Because natural gas is roughly 600 times less in volume in its liquid state than gaseous state, LNG proves to be an economic form for storage and transport. In addition to decreased volume, LNG allows natural gas to be transported overseas and for greater distances because it can be moved without pipelines. Pipelines play a major role in limiting natural gas markets as they are economically, and often politically, unfeasible for international trade. As liquid natural gas can be transported in ocean vessels, it makes natural gas more available internationally. In this form, natural gas can be transported in special tankers to receiving terminals. At these terminals, LNG is returned to its gaseous state and then distributed through local pipeline systems.

In order to understand how the LNG economy functions, it is important to understand the LNG value chain. There are multiple processes that a country hoping to produce liquid
natural gas must follow. The first step of the value chain is exploration and production. Natural gas companies, such as Cheniere Energy Inc. and Dominion Resource Inc., must collect natural gas through methods such as drilling and fracking. Next, the collected gas must be liquefied. Following this step is transportation in specialized vessels. The third step is storage and returning LNG to its gaseous state, so it is ready to move to its final destination.

Economically, LNG has the advantage of being cheaper to transport. More specifically, it costs less to transport LNG for distances over 700 miles offshore and over 2,200 by on-land pipelines. It also is more flexible in the sense that it does not require pipelines, allowing LNG distributors to deliver to where demand is greatest. Given the ease of transportation and storage of LNG in comparison to traditional natural gas, LNG presents itself as a favorable market; however, is it a good option for the United States economy?

III. The Current U.S Liquid Natural Gas Market

Due to a period of global oil price shocks in the 1980’s, the U.S demand for natural gas grew, increasing domestic production. Since then, coal has persisted as the main source of energy for the U.S, but natural gas has continued to be an additional major source. This is due to the lower environmental damage from natural gas and its domestic abundance. Currently, the U.S has the lowest net imports since 1992, illustrating the boom in the U.S natural gas industry. Despite the abundance of natural gas, the U.S currently gets roughly 1% of its natural gas from
overseas. There are currently 11 active LNG terminals, mainly along the east coast and the coast of the Gulf of Mexico. Through these terminals, LNG is imported for domestic use, but also re-exported. Most of our imports come from the Middle East and Northern Africa, where the price for natural gas is relatively low. However, the many Asian countries, specifically South Korea and Japan, have a very small supply of natural gas but a growing demand for it. Therefore, the United States purchases LNG at a low price from countries like Egypt and Yemen, and then sells it to Japan and South Korea for a profit. As of 2010, the U.S has been experiencing a shift in the ratio of exports to imports, favoring an increase in exporting natural gas. It is predicted that the U.S net exports will be 1.4 trillion cubic feet annually. Half of this will be exported in the form of LNG overseas, and the other half to Mexico via pipelines.

IV. Why should the U.S increase its exports of LNG?

With the shale gas boom, the United States has recently gained a competitive advantage in the global natural gas market. With demand for energy high, and supply universally low, there is a strong potential for economic prosperity for U.S natural gas companies. Starting with global prices for natural gas, a compelling argument is made in favor of increasing LNG exports. American prices for natural gas are roughly $3.4
per mBTU, compared to the $12 per mBTU in Europe. The prices difference is even greater compared to Asia, where natural gas costs $20 per mBTU, on average. Considering that it costs roughly $5 per mBTU to liquefy, store, and transport LNG, the United States has the potential to make large profits from international trade. Ultimately, increased LNG imports could increase the size and diversify the demand of the U.S natural gas industry. This allows for a more stable market on a flatter part of the supply curve, such that overall market price changes would be smaller and available supply would be much larger.

In addition to a favorable balance of trade, lowered domestic costs have induced a recent increase in investment into natural-gas related businesses. A notable effect of this is increase in the number of jobs in that sector, especially in manufacturing and other positions that were previously conducted abroad. Job creation would be a major result of expanding our natural gas industry. Increasing exports would stimulate more drilling and development, resulting in the creation of stable and productive jobs. One factor that has the potential to be extremely impactful on multiple fronts is establishing functioning exporting LNG terminals. America’s Gulf Coast currently has numerous idle LNG import terminals. Prior to the boom in shale gas, the U.S invested billions of dollars into making and maintaining these terminals, that would later rendered useless once our domestic supply of gas increased enough to minimize imports. Therefore, these terminals could be put to use by converting them to export terminals. While this is no trivial task and is estimated to cost roughly $5 billion per location, the economic potential through job creation and expansion would outweigh the initial costs.

Another major benefit of exporting more LNG is that it provides a better outlet for the U.S to get rid of excess natural gas. After the shale boom, the amount of natural gas we have been collecting has not only met our demand, but surpassed it. While this sounds favorable, it is simply a waste of a valuable resource due to the expensive nature of gas storage. Ultimately, gas companies would
prefer to flare, or burn off, excess natural gas rather than storing it in pipelines, as it is cheaper. At the Bakken field in North Dakota, roughly 30% of the gas they collect is flared. Not only is the economically unfavorable, but also environmentally damaging. Gas flaring has contributed to a 20% rise in U.S greenhouse gas emissions, according to an analysis by The Financial Times. The magnitude of gas flaring is so immense that these flares can actually been seen in satellite images from space and makes the U.S the fifth worst country for flaring. Instead of flaring excess gas, exporting more natural gas would provide a market for excess gas that not only avoids the issues previously highlighted, but also generate profits. Even more specifically, condensing this excess gas into LNG would allow for easier storage, more flexible trade, and an overall better system for dealing with the overly-abundant domestic supply.

Lastly, one of the long term environmental benefits of exporting more natural gas is a shift from a coal-fueled nation to a cleaner-burning fuel. While natural gas is far from free of harmful greenhouses gases, it is still a relatively clean burning fuel. Given that the U.S expands its global influence and domestic usage of natural gas, it can help to reduce global greenhouse emissions by providing a better alternative to coal. While natural gas may not promise a zero-carbon future, it is certainly a big step in the right direction.

V. Politics and Exporting LNG

Ultimately, there are a large number of benefits to increasing the exports of natural gas. Since the peak of the shale boom, only one LNG import terminal has begun converting to allow for exports and is expected to be fully function come 2015. While it seems unreasonable that only one has begun to undergo refitting, this is not the result of a lack of initiative, but rather due to political roadblocks.

Under existing United States law, it is required of companies wishing to export natural gas to ascertain a permit. Established by the Natural Gas Act of 1938 served to address natural gas’s role as a natural monopoly. This was then expanded up with the Energy Policy Act in 1992, that declares exporting natural gas to FTA approved countries is in the public’s interest and therefore permissible. Finally, in 2005, another amendment to this act included regulation of exporting and importing LNG. Currently, favorable export applications to free-
trade agreement countries (FTA) are generally rapidly authorized by the Department of Energy (DOE). Currently, the U.S has many FTA agreements internationally, with countries such as Australia, South Korea, Bahrain, Canada, Chile, and Mexico. However, with the exception of South Korea, most FTA approved countries are not probable importers of natural gas. Therefore, the profits for exporting natural gas lie in non-FTA countries that are harder to secure trading permits for. When evaluating trade applications, the DOE mainly looks at whether or not allowing transaction is of public interest, meaning good for the general population. Currently, this process is extremely slow and also being impeded by political groups and environmentalists hoping to stop further exporting of U.S natural gas.

The opposition’s main arguments concern the price of shale gas and how exports will affect it. While the price is currently historically low, an increase in exports would cause a decrease in the domestic demand. Opponents of exports argue that an increase in gas prices will stifle the revival of American manufacturing and economic growth. Multiple organizations, such as the EIA and Deloitte MarketPoint LLC, have conducted studies and made predictions of how exports will affect domestic prices, summarized in the table below.

<table>
<thead>
<tr>
<th>Study</th>
<th>Average Price without Exports ($/MMBtu)</th>
<th>Average Price with Exports ($/MMBtu)</th>
<th>Average Price Increase (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EIA*</td>
<td>$5.28</td>
<td>$5.78</td>
<td>9%</td>
</tr>
<tr>
<td>Deloitte</td>
<td>$7.09</td>
<td>$7.21</td>
<td>2%</td>
</tr>
<tr>
<td>Navigant (2010)**</td>
<td>$4.75</td>
<td>$5.10</td>
<td>7%</td>
</tr>
<tr>
<td>(2 bcf/day of exports)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Navigant (2012)***</td>
<td>$5.67</td>
<td>$6.01</td>
<td>6%</td>
</tr>
<tr>
<td>ICF International***</td>
<td>$5.81</td>
<td>$6.45</td>
<td>11%</td>
</tr>
</tbody>
</table>

Looking at this table, it is obvious that prices will increase with exports, but the impact of these price movements remains unclear. The Brookings Institution, the group that gathered this information, concluded that the U.S government should approve all export applications and trust that the global market will provide a natural upper-bound for LNG exports that is economically favorable. It is also important to recognize that these low prices are
unsustainably low and will rise domestically whether we increase exports or not, as noted by the EIA. However, studies conducted by the Department of Energy have concluded that the revenues from exporting will significantly outweigh higher domestic prices, and lead to a favorable flow of wealth into the U.S. NERA Economic Consulting completed an analysis of pertaining to this. They concluded that exporting would increase gas prices by as much as $0.33 to $1.11 per thousand cubic feet in the next 4 years, accompanied with investment and labor income falling by $10 billion come 2030. They also predicted that LNG exports could bring in revenues of $2.6 billion to $32.9 billion, and increase GDP by $4.4 billion to $47 billion in 2020. Also, it will likely be true that our domestic prices will remain low relative to other areas. Other countries have not been able to practice efficient fracking techniques to the degree with which America has, giving us a competitive advantage in the natural gas market. Therefore, by not seizing the opportunity to expand internationally, the U.S will not work to the full potential of its natural gas supply. Thus, it would be wise of the DOE to approve more LNG export applications and for restrictions on the trade of LNG to be reduced.

Word Count: [2273 words]

Resources:


Foss, Michelle. INTRODUCTIONTOLNGUpdate. Houston, Texas: Center for Energy Economics, June 2012. PDF.


