U.S. POTENTIAL AS A SWING SUPPLIER IN THE ATLANTIC BASIN

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Overview

The United States is currently undergoing a shift in its energy landscape, as technological advances such as hydraulic fracturing and horizontal drilling have allowed unconventional resources found in shale or coal seams to be economically recovered. This has expanded the U.S.'s domestic natural gas supply, and the U.S. is now projected to shift from being a net natural gas importer to a natural gas exporter. Much of the U.S. supply will be exported to traditional North American markets such as Mexico, or meet rising domestic gas demands for power generation and industrial purposes. However, terminals are being constructed to export U.S. natural gas as liquefied natural gas (LNG) to markets around the world. Sabine Pass on the Gulf of Mexico exported the first LNG cargo from the U.S. in 2016. With more terminals coming online in the next five years, the U.S. is on track to have 10 Bcf/d (billion cubic feet per day) of LNG export capacity available by 2020. This U.S. capacity expansion is roughly equivalent to the existing liquefaction capacity in the Atlantic Basin, not including mega-exporter, Qatar. A near doubling of capacity buildout is likely to impact LNG trade in the Atlantic Basin as the Henry Hub-based U.S. market starts to export and interact with international LNG markets.While natural gas markets are historically regional due to the rigidity of pipeline trade, LNG allows for more flexibility in terms of destination, so that as global LNG trade escalates, these regional markets will become more integrated. As U.S. LNG exports rise, they will likely have an impact on global LNG trade, principally because U.S. volumes tend to be more attractive to buyers due to shorter, flexible contracts and market pricing. This paper evaluates the U.S.'s role in the Atlantic Basin, and its potential to emerge as the marginal or "swing" supplier to the region between 2016 and 2030. Due to its unique position as a stable, flexible, market-based supplier, it could prove to be competitive with other historical base load suppliers. However, factors such as pricing and cost also uniquely impact the U.S.'s ability to export on a large scale.

Methods

We assess the state of the natural gas market by estimating the supply and demand balance within the Atlantic Basin for the baseline year 2016 and future years 2020, 2025, and 2030. Suppliers considered are Angola, Algeria, Nigeria, Trinidad and Tobago, Norway, and Oman. These countries have historically supplied to the Atlantic Basin, either on a large scale or in smaller quantities, or have flexible amounts of LNG that can go to any destination, and are geographically situated within the Basin. Qatar is not considered a competitor, since the assumption is that Qatar, which is by far the cheapest and most prolific natural gas and LNG supplier around the world, will continue to maintain its base load share of the market. Relevant sources of demand in the Basin are Europe and South America; while the Caribbean and Africa could benefit from U.S. LNG, they are not currently sources of demand. Egypt is the only country in Africa that currently has an import terminal, and the Caribbean lacks a unified regionial market, where individual countries have conflicting energy policies. This, coupled with poor credit ratings and low investment, makes these regions unrealistic recipients on a large scale within the time frame. Upside and downside risks to both competitive suppliers and importers within the Basin are then outlined and evaluated, in order to better estimate the U.S.'s role as a supplier. Uncertainties with the upside to LNG competitors includes efficiencies in production, leading to an increase in exports, creating more competition for the U.S. Downside risks to competitive suppliers include falling natural gas production; increased domestic demand for natural gas; retiring export infrastructure; and significant damage to LNG export infrastructure to conflict. Upside uncertainties to demand in the Basin are falling domestic production; GHG-reduction policy; price competition with other sources of fuel; supply diversification; weather variation; and economic growth. Downside risk to demand includes competition with renewable energy sources. Finally, the marginal cost of U.S. LNG export facilties is summarized, in order to better understand the role of pricing in LNG trade.

Results

We compiled total LNG demand for importers and total LNG supply for exporters, and then collected information on contracts- both fixed and flexible- between said exporters and importers. Because volumes under flexible contracts may be shipped anywhere, we assume that they are available to the Atlantic Basin; fixed contracted volumes are subtracted from total supply and total demand, to create a more accurate reflection of the LNG available

to the Basin. We then compared the total LNG supply from the established suppliers, net any fixed contracted volumes, to total LNG demand from relevant Atlantic Basin importers, net fixed contracted volumes. We concluded that the Atlantic Basin will experience a supply overhang, as see in Figure 1. Supply outpaces demand beginning in the 2020s, likely due to a number of U.S. liquefaction projects coming online.

In terms of demand, Europe appears to be the most realistic market for U.S. LNG out to 2030. The region's aggressive GHG-reduction policies support an increased use of natural gas, especially in the power sector. Further, declining domestic production in the U.K. and the Netherlands creates a supply gap opportunity for U.S. LNG. And while Europe remains the largest market for Russian pipeline gas, it is possible that U.S. LNG could be competitive against these supplies, if Europe aims to diversify its energy supply for geopolitical reasons. Nevertheless, European climate policy heavily supports the deployment of renewable energy, so that in the long term, LNG may face a shrinking market share as wind and solar energies penetrate the market in a significant manner. South America utilises LNG on a small scale, typically to supplement domestic gas production, but may consume LNG in larger quantities in the event of extreme weather. The region relies heavily on hydropower for power generation, and volatile weather patterns increase the need for gas, which provides flexible backup generation; this is especially true as the region continues to experience economic growth, and the electric grid expands to areas previously uncovered. This need is amplified by the fact that South American countries are also facing a decrease in domestic gas production, making U.S. LNG a strong contender for a share of the region's gas market. Still, it is extremely uncertain due to the inability to predict rainfall and droughts.

In looking at the cost of exporting LNG, we found that it is necessary to compare both the short run marginal cost (SRMC) and long run marginal cost (LRMC), as it better reflects pricing dynamics within the Basin. The SRMC, or variable cost, of U.S. exports tends to be low, due to the market-based Henry Hub pricing. However, the LRMC of U.S. export projects leans towards the higher end, becase of fixed liquiefaction fees which are paid upfront. The contrast in the SRMC versus LRMC makes the future of U.S. LNG in the Atlantic Basin less defined. Different scenarios, such as persistent low oil prices, high freight costs, and geopolitical motivations, could impact the dynamic of U.S. LNG prices and therefore the U.S.'s role as a supplier.

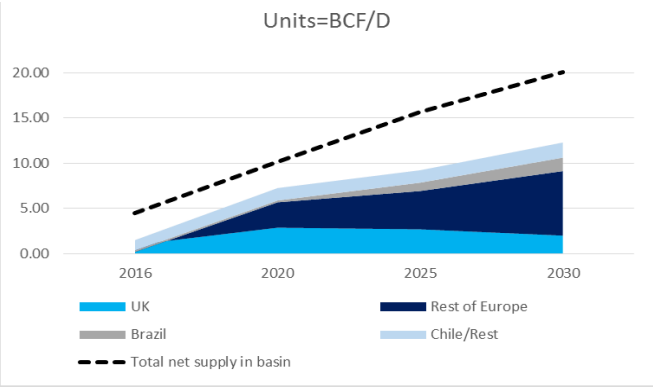

Figure 1. Net LNG Supply vs. Net LNG Demand in the Atlantic Basin

Conclusions

As U.S. natural gas production increases and U.S. LNG enters global trade, it is necessary to understand the dynamics of these markets, including risks to supply and demand, and where the U.S. lands in terms of cost to produce. Due to its unique position as a stable, flexible, market-based supplier, it could prove to be competitive with other historical suppliers in the Atlantic Basin; specifically, the European market, particularly in the face of aggressive decarbonization policies, falling domestic gas production, and geopolitical incentives. As natural gas demand grows, the U.S. can provide the Basin with flexible, market-priced LNG supplies and provide a steady back-up for countries that traditionally relied on riskier supplies from other countries However, factors such as pricing and cost also uniquely impact the U.S.'s ability to export on a large scale.