

Global Natural Gas Markets: Their rapid expansion and the implications to the Southern Rockies

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Beginning in 1821 when William Hart dug a 27' gas well in Fredonia NY, persistence, perspiration and technological innovation has seen the United States become a natural gas powerhouse.

Five years ago, the U.S. overtook Russia as the number one gas producer in the world. With the advent of liquefied natural gas (LNG); the United States is now in the process of flexing its natural gas export muscle on the world stage. In only 21 months, the US LNG market has gone from exporting nearly nil to almost 2 billion cubic feet of gas per day (BCFD), to 25 different countries. Global demand for gas has been steadily rising, and it is projected the United States could be exporting almost 10 BCFD by 2025.

The global demand for gas has been steadily rising, resulting from numerous factors, including: environmental causes (e.g.: diminished role of coal), transportation electrification, chemical manufacturing, industrial demands, and rapidly developing third world countries. Future world demand is bullish, and US Producers see opportunity.

However, the intricacies of global competition and politics have large impacts on which nations will win the impending LNG race. In particular, Qatar, Australia and Malaysia/Thailand have huge reserves, excellent geographic access to the red hot Asia market and an enviable head start. At the same time, Qatar's long term high-priced LNG contracts could be in peril, plus Qatar has been facing mounting political strife and uncertainty from adjacent unpredictable and self-serving monarchies.

Australia faces diverting international-bound LNG to local domestic shortages, while also dealing with fracking bans and restrictions to coal-seam exploration. The other elephant in the room is Russia due to their monstrous gas accumulations, very ambitious short term pipeline plans, and long term LNG visions. But some of their grand ambitions have begun to flounder. According to Reuters in June, after 10 years of negotiations, two large pipelines into China (representing almost 4 BCFD) could potentially be sacked for more competitively priced spot market LNG. In Europe, Russia's 5.3 BCFD Nord Stream-2 line into Germany might not get off the ground due to the recent U.S. sanctions and is getting pushback from a few countries opposed to being over-dependent on Russia.

Although piping methane is cheaper relative to LNG transportation, Russia's mid-stream suffers from very high levels of CO2 emissions. By comparison, U.S. shale gas production involves methane leaks of about 1.5 percent of overall gas volume (the lowest emissions rate of any major producer in the world), while Russian gas, in contrast, leaks at least 5-7 percent. In fact, Paul Bledsoe wrote in The Hill that when leakage exceeds 3.5 percent of overall gas volume, gas is no better than coal from a climate change perspective.

The combination of shale gas technology and natural gas mobility has allowed the U.S. to be a natural gas net exporter for the first time in almost 60 years. Since 2008 the United States has increased its natural gas marketed production from 55 BCFD to over 78 BCFD, and production will not peak anytime soon.

In 2016, the United States Geological Survey (USGS) estimated the Northwest Colorado Piceance Basin alone is estimated to have 67 trillion cubic feet (TCF) of recoverable gas reserves. Critical to marketing these substantial reserves is increased demand; therefore a newly proposed LNG plant in SW Oregon is drawing wide attention. This plant would create the MOST DIRECT access to the burgeoning Asian market for US suppliers, creating a strategic geographic advantage over the dominant Gulf Coast exporters. Just this past August, Japanese representatives met a western Colorado delegation in Grand Junction to discuss the subject.

In the Four Corners vicinity, the San Juan Basin is gradually experiencing its own rejuvenation via the upstart Mancos Formation and increased drilling for coal seam gas. Preliminary estimates indicate over 100 TCF could be potentially

recoverable in the Mancos, and new players such as Hilcorp Energy and Enduring Resources plan to infuse substantive risk-capital into the basin in the near future. Established operators, WPX and BP, have publicized recent high rate wells. BP's newest Mancos well flowed over 13 million cubic feet of gas/day, and quoting BP's CEO Dave Lawler; *"This result supports our strategic view that significant potential exists in the San Juan Basin, and gives us confidence to pursue additional development of the Mancos, which we believe could become one of the leading shale plays in the U.S."*

The San Juan Basin currently has significant pipeline capacity and multiple directions to send its gas resources. In particular, the emerging Mexican market offers tremendous upside. The combination of Mexico's rapidly decreasing domestic production and privatization of its electricity market in 2013 resulted in U.S. exports to Mexico doubling since 2013 (~4.5 BCFD), and this number could double again in the next 2-3 years. The number one cog in this rapidly developing demand is Mexico's lack of domestic pipeline infrastructure. As a comparison, Mexico has less than 10,000 linear miles of pipelines relative to 300,000-plus in Texas.

But the Piceance and San Juan Basins also have their challenges. Prior to BP's most recent Mancos test, breakeven prices had been hovering near \$3.00 per thousand cubic feet of gas (MCF), and as of this writing the price has been struggling to buck \$2.60/MCF. In addition, there is concern that a strong uptick in drilling would require additional midstream infrastructure due to insufficient high pressure lines. And similar to many other re-vitalized frac-driven basins, operators could witness manpower and material shortages.

In conclusion, even though the current LNG global market is oversupplied and domestic demand is soft, intermediate and long-term global natural gas demand construction looks very bullish, especially relative to crude oil. Low finding and development costs, aggressive mid-stream projects and rapidly developing LNG infrastructure will allow certain gas basins to capitalize on this paradigm shift of energy demand.

Rapidly expanding solar and wind power will continue to increase their respective market share and provide substantial environmental benefits, but BP's June 2017 World Energy Report states that wind and solar unfortunately represent less than 5 percent of our global energy needs at present.

In China alone, LNG demand has increased 43% just since the beginning of this year. In 2017 China is expected to consume over 8 TCFe, even though natural gas accounts for only 7% of their current energy mix (Coal is ~60%). Presently there are over one million air-pollution related premature deaths in China per year, significantly adding to the pressure to eliminate their more affordable, environmentally unfriendly coal. Neighboring India has over 240 million citizens still without electricity, and only 4 out of 100 own a vehicle (U.S. is 88/100).

Mexico's need to decarbonize has resulted in dramatic decreases in its reliance on dirty fuel oil to produce power. Because Pemex, Mexico's state-owned petroleum company, has poorly managed their own resources, Mexico now imports 60 percent of its natural gas from U.S. producers, compared to just 22 percent in 2010. In addition, Southern Rockies competition with the Permian/Delaware basins for the expanding Mexican market will potentially be eased when a 3 BCFD pipeline from West Texas to the Gulf Coast is completed in 2019.

Notwithstanding a sizable International skirmish, it's likely there will be a cap on oil prices for the foreseeable future. Therefore the intermediate and long term positive implications for job creation and increasing profit margins in the energy sector potentially lie in the areas with the most direct access to Mexican and Asian gas demand centers. Although this could be 1-3 years in the making, the Southern Rockies could be well positioned for bullish long term economic gains.

Natural gas has been called the 'bridge fuel' for decades. Maybe the time has finally come to make this a reality. But to compete, we'll still need to *persist, persevere and technologically innovate*.

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