# Helium in 2016

## Brisk sourcing activity, despite ample supply

By Phil Kornbluth

Despite sluggish growth in demand and continued ample supply in global helium markets, the level of activity aimed at developing new sources of helium continues at an unprecedented rate. This article examines the drivers behind the current high level of interest in developing new helium sources, where the activity is taking place, which companies are participating, and some of the possible outcomes.

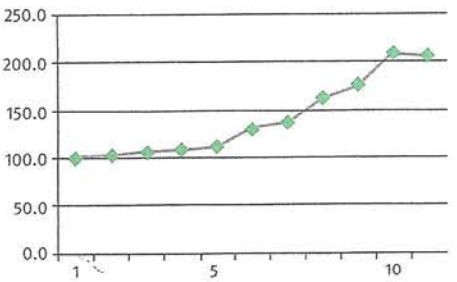
**Key drivers of the "helium rush"**

Coming out of Helium Shortage 2.0, which lasted for three years from 2011 – 2013, helium demand has been significantly less than it was pre-shortage due to "demand destruction" caused by the price elasticity of demand. Quite simply, when prices for a commodity go up, demand goes down. With prices for helium roughly doubling during the shortage, and forced rationing imposed on helium users, those users collectively figured out how to consume less helium in their operations.

While prices have come down somewhat since the shortage ended early in 2014 (when supply from the Helium 2 source in Qatar ramped up to full capacity), they remain at elevated levels compared to historical prices. With no large new applications and continued incentives to reduce usage due to elevated pricing, helium demand growth has remained tepid since the shortage ended.

On the supply side, a significant amount of capacity has been taken off-line by the helium refiners linked to the Bureau of Land Management's (BLM) Crude Helium Pipeline and Storage System (BLM Pipeline) and some major suppliers having taken the radical and unprecedented step of reinjecting liquid helium into the BLM

**Bulk Liquid Helium Wholesale Prices**
Source: Kornbluth Helium Consulting, LLC.



Pipeline to avoid missing take or pay commitments. These actions have helped to create a new equilibrium between supply and demand. In fact, three of the six liquid helium plants tied to the BLM Pipeline have been completely shutdown (except for reinjection activity at one plant) mostly due to lack of demand.

With weak demand and ample supply, the obvious question is…why are we seeing a rush to develop new sources (the "Helium Rush") now, at a time when market fundamentals might lead you to expect far lower levels of activity? The author believes that there are at least three reasons for the current high level of activity: continued elevated prices for helium; the depletion of the US government's helium stockpile and the continuing decline of the BLM Pipeline; and, weak markets for oil and gas.

**Elevated prices**

The first noteworthy factor contributing to the high level of helium sourcing activity is the elevated prices for helium that are a remnant of Helium Shortage 2.0, even though helium supplies have been ample for more than two years.

With higher prices, there are greater economic incentives to develop new sources of helium. Where previously, helium was only produced as a by-product of natural gas processing and LNG production, heretofore uneconomic sources of helium-bearing gas, including gas with very low concentrations of hydrocarbons, can now provide attractive financial returns solely from the sale of helium.

This has opened up new areas for development of helium sources, including the Four Corners area in the Southwestern US, an area encompassing SW Saskatchewan, SE Alberta and northern Montana, and previously unexploited deposits of helium in Tanzania that were previously ignored, under-explored, and generally considered to be not worth the trouble. Improvements in non-cryogenic purification technologies like pressure swing adsorption and membrane separation have also contributed to improved economics for helium recovery, especially for smaller, non-hydrocarbon sources. Over time, these technologies have become lower cost, more efficient in terms of helium recovery rates and more reliable.

Tapping the BLM pipeline. Photo courtesy of IACX.

**Decline of BLM Pipeline & Storage**

The second factor in the high level of helium sourcing activity is the ongoing decline of the BLM Pipeline & Storage System caused by the depletion of the US Federal Helium Reserve.

**"Improvements in non-cryogenic purification technologies like pressure swing adsorption and membrane separation have contributed to improved economics for helium recovery..."**

The BLM has been gradually selling off the Federal Helium Stockpile since 2003 and will continue to sell crude helium to both helium refiners and other qualified buyers until the terminal inventory of 3.0 BCF (billion cubic feet) is reached sometime after the FY 2018 or FY 2019 sale. Subsequently, crude helium from the Federal Stockpile will only be made available for sale to government helium users. With the quantity of crude helium in the stockpile down to 5.57 BCF as of July 1, 2016, the BLM Pipeline has lost a significant portion of its ability to deliver crude helium to the helium refiners (due to declining pressure from the field). This means that collectively, the helium refiners have lost a considerable amount of what, at one time, was roughly 4.0 BCF of annual liquid helium production capacity. The major refiners — Air Products, Linde, and Praxair — are all quite motivated to replace their BLM capacity (as well as other declining sources), ideally in locations that are subject to minimal levels of political risk, with good proximity to major helium markets.

The need to replace BLM capacity is not the only driver of demand for new sources. Some of the major helium marketers would like to diversify their supply away from major producers, who have increasingly imposed hard-nosed commercial tactics, while others seek to add flexibility to their supply portfolio or are driven by their own unique circumstances.

**Low priced oil and gas**

The third major factor contributing to the "Helium Rush" is the extremely low prices for oil and natural gas that have made exploration for hydrocarbons uneconomic in many places, bankrupted a number of E&P companies, and left many of these companies looking for opportunities to put their skills to work in an area where they can make a reasonable profit.

Some of these companies have zeroed in on helium source development and a handful of new companies have been established with their primary focus on helium. With helium refiners needing to replace their BLM capacity, E&P companies looking for opportunities to apply their skills while oil and gas prices remain depressed, and elevated helium prices ▸

opening up new geographies for helium production, the current Helium Rush becomes a lot easier to rationalize.

**Where is the activity taking place?**

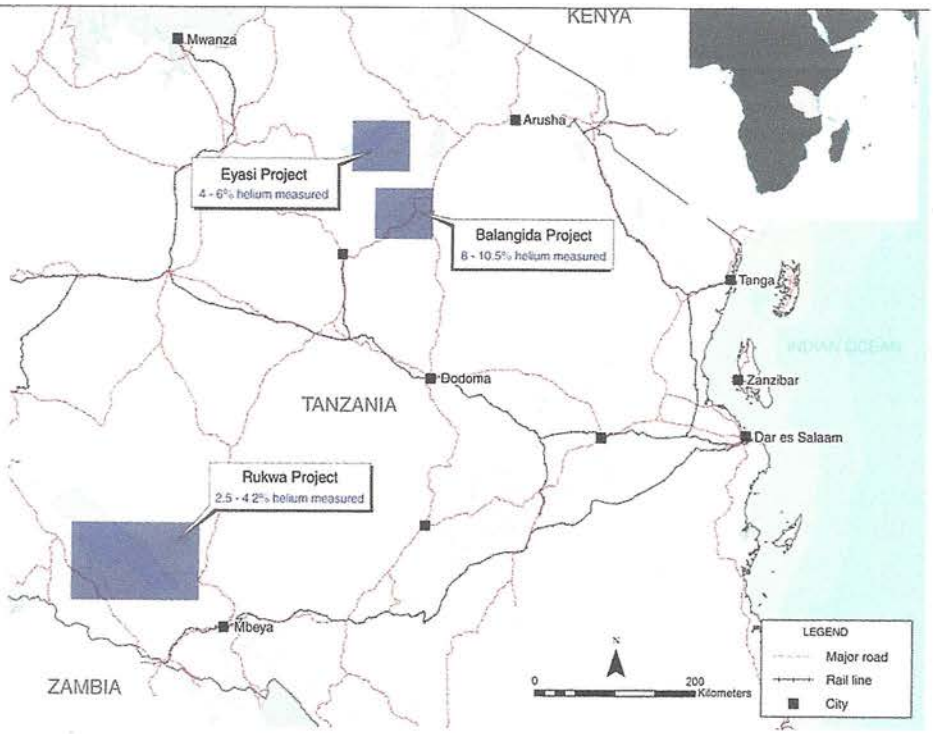
Among the conventional projects (helium produced as a by-product of natural gas processing) that are currently under development (and which have been publicly disclosed) are RasGas' Helium 3 Project in Qatar, which is scheduled to add 425 MMCF (million standard cubic feet per year) of capacity to the market in 2018, and Gazprom's Eastern Siberian Amur Project, which is expected to commence production in 2021 and could increase output in stages to 2 BCF/year or more by 2025, if there is sufficient market demand.

There has been a fair amount of speculation about possible slippage of this project, due to the current weakness in the Russian economy caused by low prices for oil and gas. Some of the aspiring new entrants to the helium business are betting that a "window of opportunity" will be created by possible delays of the Amur Project, combined with the BLM ending commercial sales of crude helium, in the early 2020s.

For non-conventional (helium only) sources, the hotbeds of activity have been the Four Corners area of the Southwestern US, where helium concentrations can be as high as 8%, an area that includes SW Saskatchewan, SE Alberta and parts of northern Montana and to a lesser extent, the US mid-continent area. More recently, a start-up company named Helium One has announced its intentions to develop large-scale helium production from gas in Tanzania that has helium concentrations ranging from 2.5%–10.5%. Africa seems to be waking up to the idea of helium production, as Renergen has recently announced its intention to produce by-product helium in cooperation with Linde from a helium-rich field located in the Free State of South Africa beginning in 2019.

**Some of the players**

In my consulting practice, I have come across at least 15 companies who are attempting to commercialize new helium projects from unconventional sources.




Source: Helium One | **Africa is waking up to helium production and intentions are afoot to develop large-scale helium production from gas fields in Tanzania.**

IACX Energy has already built a number of small plants that produce balloon grade helium and claims to have nine plants in operation in 7 locations, with additional projects in the works. Most of IACX's projects are in the US mid-continent and Four Corners areas. Nacogdoches Oil & Gas, using IACX technology, is producing helium in the Four Corners area, where a handful of other small companies are active.

In the Saskatchewan/Alberta/Montana area, Weil Group Resources' Mankota, SK plant should be in production by the time this article is published, and a company called Canadian Helium already has a small plant operating in Saskatchewan. Start-ups like Navis Resources are also actively trying to develop helium projects in this area.

Other companies who have recently disclosed plans to develop helium production include Helium One (Tanzania), Jasper Mining, Gulf Energy and a handful of others.

**The end game?**

What will be the result of the Helium Rush? No doubt, some of the companies actively pursuing new helium projects will succeed. Those who succeed will likely have larger, less risky and more conveniently located helium reserves to exploit, have greater access to capital and stronger management teams.

Some of these potential projects will surely not come to fruition, as there is simply not enough demand for helium in the world to provide markets for all of the potential new capacity. And some of those who do succeed will consolidate into larger companies or be gobbled up by the major industrial gas companies who covet long-term, secure supplies of helium.

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ABOUT THE AUTHOR

Phil Kornbluth is the President of Kornbluth Helium Consulting, LLC. He has worked in the helium business continuously for the last 33 years, including stints running the global businesses of both BOC Gases and the MATHESON subsidiary of Taiyo Nippon Sanso Corporation (TNSC). Kornbluth can be reached at:
**Phil@KornbluthHeliumConsulting.com**
or +1 (908) 745-9779.